

FORTY-FIRST ANNUAL REPORT

OF THE

DEPARTMENT OF MARINE AND FISHERIES

1908

M A R I N E

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

PRINTED BY C. H. PARMELEE, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY

1909

To His Excellency the Right Honourable SIR ALBERT HENRY GEORGE, EARL GREY,
VISCOUNT HOWICK ; BARON GREY OF HOWICK ; A BARONET, G.C.M.G., &C., &C.,
&C., &C., Governor General of Canada.

MAY IT PLEASE YOUR EXCELLENCY :

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the Forty-First Annual Report of the Department of Marine and Fisheries, Marine Branch.

I have the honour to be,

Your Excellency's most obedient servant,

LOUIS-PHILIPPE BRODEUR,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, November, 1908.

SUMMARY OF CONTENTS

	Page.
REPORT SUBMITTED BY MINISTER.. . . .	iii
REPORT OF DEPUTY MINISTER.. . . .	1
A	
Appropriations and Expenditure.. . . .	2
<i>Arctic</i> —Dimensions and movements.. . . .	20
“ Cruise to Hudson Strait and Northern waters.. . . .	25
<i>Aranmore</i> —Chartered.. . . .	21
<i>Aberdeen</i> —Dimensions and movements of.. . . .	21
Agents of Department—Reports from.. . . .	29
Aids to Navigation—new—Nova Scotia.. . . .	64
“ “ New Brunswick.. . . .	68
“ “ Prince Edward Island.. . . .	70
“ “ Quebec.. . . .	70
“ “ Montreal.. . . .	75
“ “ Ontario.. . . .	78
“ “ British Columbia.. . . .	83
B	
Buoys and Beacons.. . . .	10
“ List of.. . . .	11
“ “ Ontario.. . . .	11
“ “ Quebec.. . . .	11
“ “ New Brunswick.. . . .	12
“ “ Prince Edward Island.. . . .	13
“ “ Nova Scotia.. . . .	13
“ “ British Columbia.. . . .	14
Belleville, Ont., Harbour Commissioners, Summary of Report.. . . .	54
C	
Correspondence.. . . .	17
<i>Champlain</i> —Dimensions and movements of.. . . .	20
<i>Cascade</i> —Chartered.. . . .	23
Charlotte County, N.B., Pilotage rates.. . . .	43
Chief Engineer’s Report.. . . .	59
“ Detail Report.. . . .	64
Commissioner of Lights Report.. . . .	86
D	
Dominion Steamers and Fog-alarms, Inspection of.. . . .	10
Dominion Steamers—Dimensions and movements.. . . .	17
<i>Druid</i> —Dimensions and movements.. . . .	20
E	
<i>Eureka</i> —Dimensions and movements of.. . . .	20
Expenditure—Statement of for last twelve months.. . . .	132
“ “ since Confederation.. . . .	144

	Page.
H	
Hydrographic Service..	9
Hydrographic Survey..	61
" Report of Hydrographer..	198
<i>Hackett, William</i> —Chartered..	21
Hudson Bay and Northern Waters Expedition..	25
Halifax Dockyard..	31
Halifax Pilotage rates..	39
Halifax Harbour..	53

I	
Illuminants and Illuminating Apparatus and Gas-buoys..	5
Ice-breaking Steamer, Straits Northumberland—Tenders for..	24
Investigation into Wrecks and Casualties..	32
" " " Report of Wreck Commissioner..	205
Ice-breaking—Thunder Bay..	61
" Georgian Bay..	61
" St. Lawrence River..	104

L	
Lighthouse Service..	3
Lighthouse Board..	8
Lightships..	9
Lighthouses—Inspection of	10
<i>Lady Laurier</i> —Dimensions and movements of..	21
<i>Lansdowne</i> —Dimensions and movements of..	22
Life-saving Service..	30
" Statement of Stations and Equipment..	194
Live Stock, Shipments..	37
" " Statement of..	171
Louisburg Pilotage rates..	41
Legislation..	57
Light Stations, Lights, &c., number of..	91
<i>Lady Grey</i> —Movements of..	100
Lightkeepers and Stations, List of..	176
" " " Prince Edward Island..	176
" " " Nova Scotia..	177
" " " New Brunswick..	181
" " " Quebec..	182
" " " Above Montreal..	186
" " " British Columbia..	190

M	
Marine Branch Sub-divisions..	1
Merchant Shipping..	17
<i>Minto</i> —Dimensions and movements of..	17
<i>Montcalm</i> —Dimensions and movements of..	19
<i>Maude</i> —Chartered..	23
Meteorological Service..	24
" Director's Report..	156
Magnetic Observatory..	168
Masters' and Mates' Certificates..	32
" Report of Chief Examiner..	169
Marine Hospitals..	35
Montreal Pilotage rates..	38
Montreal Harbour Commissioners, Summary of Report..	45
Marine Schools..	192

SESSIONAL PAPER No. 21

	Page.
N	
North Sydney, N.S., Pilotage rates..	44
“ Harbour Commissioners, Summary of Report.. . . .	53
O	
Oil for Lighthouses..	16
P	
Port Wardens..	33
Pilotage—Rates of in certain ports..	37
Pictou Pilotage rates..	40
Pugwash, N.S., Pilotage rates..	43
Parrsboro, N.S., Pilotage rates..	44
Q	
<i>Quadra</i> —Dimensions and movements of..	23
Quebec Pilotage rates..	38
Quebec Harbour Commissioners, Summary of Report.. . . .	49
R	
Richmond County, N.S., Pilotage rates..	44
Restigouche, N.B., Pilotage rates..	45
Removal of Obstructions to Navigation..	60
Revenue..	134
“ Sick Mariners’ Dues..	134
“ from Lighthouse and Coast Service..	135
“ Steamboat Inspection Dues..	135
“ Harbours, Piers and Wharfs..	137
S	
Sorel Shipyard..	8
“ Report of Director of..	201
“ Statement of Revenue and Expenditure..	204
St. Lawrence River Route..	8
Sable Island..	9
<i>Stanley</i> —Dimensions and movements of..	18
Steamer for Georgian Bay, Tenders for..	24
Steamer Straits of Northumberland, Tenders for.. . . .	24
Superintendent of Lights above Montreal, Report of.. . .	29
Steamboat Inspection..	31
“ Names of Inspectors..	31
“ Chairman’s Report..	139
Seamen—Shipping of..	32
Sick and Distressed Mariners..	35
St. John Pilotage rates..	39-40
Sydney Pilotage rates..	40
St. John, N.B., Harbour..	54
Submarine Bells..	92
St. Lawrence River Ship Channel..	5
“ “ Superintending Engineer’s Report..	93
“ “ History of Ship Channel..	94
“ “ Progress of operations..	95
“ “ Plans for the future..	97
“ “ New Dredges..	103
“ “ Average depth in 27½-foot Channel..	113

	Page.
St. Lawrence River Ship Channel—Average depth in 30-foot Channel.. . . .	113
“ “ Cost of dredging, 1907.. . . .	114
“ “ Total miles dredged.. . . .	118
“ “ Total miles to be dredged.. . . .	118
Signal Stations.. . . .	171
Stations and Lightkeepers.. . . .	176

T

Toronto Harbour Commissioners, Summary of Report.. . . .	49
Three Rivers, P.Q., Harbour Commissioners, Summary of Report.. . . .	52
Tidal and Current Survey.. . . .	62

V

Vancouver Pilotage rates.. . . .	41
Victoria Pilotage rates.. . . .	42
Vancouver Harbour.. . . .	55
Victoria Harbour.. . . .	56

W

William Joliffe—Chartered.. . . .	23
Wrecks and Casualties.. . . .	32
“ Report of Investigations.. . . .	205
Wrecking Plant.. . . .	33
“ Vessels salvaged.. . . .	33
Wireless Telegraphy.. . . .	227

ILLUSTRATIONS

Dredge *Beaujeu* (No. 8) before loading. See St. Lawrence River Ship Channel Report.

Placing Tripod and Submarine Bell in the water.

Pachena Lighthouse, B.C.

Dredge *Beaujeu* (No. 8) after loading.

C.G.S. *Lady Grey*.

Lake St. Peter Curve, No. 2, Upper Pier and Lighthouse, looking south, April 26, 1908.

Dredge *Galveston* (No. 9).

Lady Grey working in Lake St. Peter ice, three to four feet thick.

East Point Light Station, P.E.I.

C.G.S. *Lady Grey* in the ice opposite Sorel Point, December 7, 1906.

Dredge *Beaujeu* (No. 8), Cutter head.

Spruce Shoal approach to Parry Sound crib where first sunk, August 12, 1907.

Hope Island, new Fog-alarm and reinforced concrete chimney, June 6, 1908.

Pigeon Island Lighthouse (incomplete).

Cape Ray, new Fog-alarm and Marconi Buildings.

Guard Pier Lighthouse, Montreal, P.Q.

Combined Gas and Whistling Buoy in tow. Light 30 feet above water.

Cable Landing, Chebucto Head. Cable connecting station with Submarine bell.

Spruce Shoal, Parry Sound, Gas Beacon, Ont.

Placing Submarine Bell on Tripod.

Spruce Shoal Lighthouse, approach to Parry Sound, foundation on way to position, August 11, 1907.

Pachena Light Station, B.C.

Chebucto Head, N.S., Lighthouse, Fog-alarm and Submarine Station.

Red Rock, Georgian Bay Lighthouse.

The *Arctic* in winter quarters, Albert Harbour, Ponds Inlet, 1906-7.

Little Hope Island Station, showing concrete tower built 1907.

Prince Rupert, B.C., Docks.

Banfield, B.C., Lifeboat and Boathouse.

Banfield Lifeboat and Boathouse.

Prince Rupert Harbour, B.C.

Banfield Creek Lifeboat House, B.C.

Laying Cable from Tank between Station and Submarine Bell.

Parry Sound, new Government Dock.

New Government Wharf and Depot, Parry Sound, Ont.

Southampton, new Lifeboat House, May 7, 1908.

Three Lightships in tow of C.G.S. *Druid*.

Port Arthur Lighthouse, October 8, 1907.

Lillooet, Canadian Hydrographic Survey Steamer, British Columbia.

Section of Gas-buoys.

REPORT

OF THE

DEPUTY MINISTER OF MARINE AND FISHERIES

To the Honourable Louis Philippe Brodeur,
Minister of Marine and Fisheries.

SIR,—I have the honour to report on the transactions of the Marine Branch of this department for the fiscal year ending March 31 last.

The usual maintenance of aids to navigation received the attention of the department and many improvements were made in the existing aids. Applications for new lighthouses for gas and other buoys were considered by the Lighthouse Board, recommended and approved and many of these new aids were established. The detailed reports of the work completed and for which notices to mariners were issued, will be found in the reports of the Chief Engineer and Commissioner of Lights.

The numerous applications for the most improved fog alarm and lighting apparatus, and gas buoys continues. It has, however, been impossible to comply with these requests in all cases, owing to the great cost. The department has, as far as possible, established lighthouses, range lights, buoys, beacons and other aids at points and in waters where the greatest need existed. For the establishment of the new aids and the improvement of the existing aids, together with maintaining large warning buoys in an efficient state, and to convey construction material to the light-stations, it was sometimes necessary to employ chartered steamers and tugs in addition to the Dominion steamers. These chartered steamers are not specially constructed for handling aids to navigation and therefore, it has been considered more economical and satisfactory to increase the fleet of Dominion steamers, by building vessels specially designed and supplied with the most efficient apparatus. Definite information, upon the construction of the new steamers, will be found in that part of the report dealing with the subject in detail.

Icebreaking in ports in the Georgian Bay has been necessary, in order that grain laden vessels may reach their destination with safety. Contracts were entered into for the fall of 1907 for icebreaking at Collingwood, Depot Harbour and Midland in Georgian Bay, and at Port Arthur and Fort William, Lake Superior. The contracts were made to suit navigation at the several ports and terminated on or about December 10 for Collingwood, December 16 for Depot Harbour, the 12th of the same month for Midland and for Port Arthur and Fort William on or about December 17. The last-mentioned contract includes opening of the harbour in the spring.

Lightkeepers at important stations in Georgian Bay and Lake Superior, were instructed to keep their lights in operation until December 10, and were relieved by

a steamer, hired to convey them from their isolated localities to Sault Ste. Marie and elsewhere.

The work was carried on in the following subdivisions of the Marine Branch as usual, viz:

- The construction of lighthouses and fog-alarms.
- The maintenance of lights, gas buoys and other buoys.
- The lighthouse board, which decides the necessity for aids to navigation.
- The hydrographic surveys.
- The tidal surveys.
- The ship channel St. Lawrence river and Sorel works.
- Meteorological and magnetic service.
- Investigation into wrecks.
- Board of steamboat inspection.
- Cattle shipments inspection.
- Wireless telegraph service.
- Signal service.
- Life saving service.
- Marine hospitals.
- Submarine signalling.
- Shipping under the Merchants' Shipping Act.
- Legislation and administration of laws relating to the Department of Marine and Fisheries.
- Humane service in connection with seamen.
- Wrecking plant subsidised.
- Winter communication.
- Removal of obstructions to navigation.
- Examination of masters and mates, and issuing certificates.
- Naval militia.
- Pilotage.
- Government of ports and proclaiming of harbours in the Dominion.
- Control of government wharfs.
- Dominion steamers, Marine and Fisheries.
- Hudson Bay and navigation of northern waters.

APPROPRIATIONS AND EXPENDITURE.

OCEAN AND RIVER SERVICE.

Appropriation.. . . .	\$1,064,750 00
Expenditure.. . . .	881,054 56
Expenditure less than appropriation....	\$ 183,695 44

PUBLIC WORKS CHARGEABLE TO CAPITAL.

Appropriation.. . . .	\$1,115,360 00
Expenditure.. . . .	1,074,027 91
Expenditure less than appropriation.. .	\$ 41,332 09

LIGHTHOUSE AND COAST SERVICE.

Appropriation.. . . .	\$3,040,090 00
Expenditure.. . . .	2,835,459 44
Expenditure less than appropriation.. .	\$ 204,630 56

SESSIONAL PAPER No. 21

SCIENTIFIC INSTITUTIONS AND HYDROGRAPHIC SURVEYS.

Appropriation including special vote for hydrographic steamer for British Columbia.. . . .	\$ 449,500 00
Expenditure.. . . .	349,373 37
Expenditure less than appropriation.. . . .	\$ 100,126 63

MARINE HOSPITALS.

Appropriation.. . . .	\$ 70,500 00
Expenditure.. . . .	67,585 17
Expenditure less than appropriation.. . . .	\$ 2,914 83

STEAMBOAT INSPECTION.

Appropriation.. . . .	\$ 47,500 00
Expenditure.. . . .	42,210 43
Expenditure less than appropriation.... .	\$ 5,289 57

CIVIL GOVERNMENT.

Appropriation of Marine and Fisheries.. . . .	\$ 107,775 00
Expenditure of Marine and Fisheries.. . . .	103,916 53
Expenditure less than appropriation.... .	\$ 3,858 47

CONTINGENCIES.

Appropriation.. . . .	\$ 21,150 00
Expenditure.. . . .	21,146 77
Expenditure less than appropriation	\$ 3 23

Total appropriation, Fisheries Branch, not including civil government and fisheries bounty.. . . .	\$ 196,306 00
Total expenditure Fisheries Branch, not including civil government contingencies and fisheries bounty..	800,081 73

Total expenditure less than appropriation....	\$ 396,224 27
---	---------------

Grand total appropriation.. . . .	\$7,112,931 00
Grand total expenditure.. . . .	6,174,855 91

Grand total expenditure less than appropriation.. .	\$ 938,975 09
---	---------------

The fisheries expenditure is merely added to show the total expenditure of the department, and has no connection with this report.

LIGHTHOUSE SERVICE.

The lighthouse service of the Dominion is divided as follows:—The Ontario division, embracing all lights from Montreal westward to the Northwest Territories; the Quebec division, extending below Quebec and including the St. Lawrence river from Platon, the Gulf of St. Lawrence and Strait of Belle Isle and Cape Ray, Newfoundland, the Montreal division, including the St. Lawrence river from Mont-

8-9 EDWARD VII., A. 1909

real to Platon; the Nova Scotia division, including St. Paul's island, Sable island and Cape Race, Newfoundland; the New Brunswick division, the Prince Edward Island division and the British Columbia division, each including lights within the provincial boundaries.

In the several districts in charge of agents under departmental control, the usual attention has been given to the service in carrying out the requirements of navigation and the agents have made their annual reports. The district above Montreal, not being in charge of an agent, has been controlled directly by the department in connection with aids to navigation.

The Superintendent of Lights for the district above Montreal has his office in the department at Ottawa and has reported upon his work.

The total number of light stations and lightships in the Dominion is 978, and lights attached to these stations number 1,175; the number of steam whistles, fog-horns, bells and fog-guns is 117; the lightkeepers and engineers of fog-alarms according to the pay-lists, number 914, gas buoys 213, whistling buoys 20, bell buoys 52, and submarine bells 9.

The chief engineer's report relating to lighthouse construction, repairs, tidal surveys, &c., contains detailed information. Personal inspection of a number of stations was made by him, upon which he has reported. He also made a special survey of the Restigouche river, the results of which are embodied in a new plan issued by the hydrographer of the admiralty.

Icebreaking at Collingwood, Midland and Depot Harbour in Georgian bay and in the approaches to Port Arthur and Fort William, Lake Superior, was performed in connection with his branch. A report of the work done will also be found in the chief engineer's report.

The principal repairs, changes and improvements at existing stations are referred to in the same report, also new aids to navigation. The work done at fog-alarm stations in connection with steam whistles, compressed air horns and explosives is dealt with under the proper headings. The report contains information respecting the extent of repairs and some account in detail, under the head of the station. The report of the inspector of fog-alarms, is appended to the chief engineer's report.

During the past year, thirty new lighthouses, ten fog-alarm stations and sixteen gas lighted beacons, were established.

Surveys of the lighthouse reserves at Presque Isle and on the Thames river were made with the object of regulating the campers on these government properties, and now all government lands are under lease and strict regulation.

Changes in the colouring of seven lighthouses in Nova Scotia, were made, to cause them to look more conspicuous during the winter. Red horizontal bands were painted on a white ground on some lighthouses and red vertical stripes on others.

Six new lights were established in Nova Scotia. Three new lighthouses were built in New Brunswick, and one fog-alarm building. One fog-alarm building is under construction but not in operation in that province. Six fog-alarm stations, were established in British Columbia, with keeper's dwellings attached to them.

Cape Race, Newfoundland, is a station maintained by the Dominion government. The sounding apparatus at this station was changed from a whistle to an air

SESSIONAL PAPER No. 21

driven diaphone type of fog-alarm. An electric plant was installed for the purpose of illuminating the engine room and other parts of the building.

Cape Ray, also in Newfoundland, is a station maintained by the Dominion government.

Report of W. P. Anderson, C.E., &c., forms Appendix No. 1.

ILLUMINANTS AND ILLUMINATING APPARATUS AND GAS BUOYS.

The report of the Commissioner of Lights contains reference to the substitution of dioptric apparatus, in a number of important coast lights and an extension of the gas buoy and beacon service.

The report contains a list of the different kinds of illuminating apparatus shipped from the Dominion Lighthouse Depot, Prescott, to certain light stations. The kinds of apparatus consist of reflectors, lamps, burners, Chance Bros. lenses, French lenses, fixed and occulting apparatus, the Chance Bros., vapour installation and diamond vapour installation. The old apparatus at each place mentioned in the list, has been removed and the new substituted, by employees from the depot. In other cases apparatus has been sent to the agents of the department who had the changes made by the employees under their control, details of which are found in the same report.

The gas buoy service has been very much improved by the increased number of buoys sent to the different agencies. Combined gas and whistling buoys and combined gas and bell buoys, have been substituted, in a number of instances, for the old style Courtenay whistling buoys and for the Trinity and American pattern bell buoys, with beneficial results. The gas buoys which included the combined buoys in the report for the fiscal year 1906-7, numbered 183. The total number of all kinds of gas buoys at present established is 213, showing an increase of 33 gas buoys.

The submarine bells have been employed with excellent effect and now number nine. The report of the Commissioner of Lights contains a description of the manner of operating these warnings, one method being by electricity, another by compressed air and the third by attaching them to gas buoys. The localities where submarine warnings are established are indicated in the report.

The steamers *Scout* and *Reserve*, have been employed entirely on the St. Lawrence river above Montreal, in maintaining the gas buoy service and attending lighthouses illuminated by acetylene gas.

The gas buoy service in Georgian bay, has been operated from the Parry Sound Depot, but owing to the fact that the government steamer has not been available, hired tugs have been employed to maintain the buoys in position.

The report of the Commissioner of Lights contains a comprehensive table of the aids to navigation established to date in the Dominion. The report forms Appendix No. 2 to this report.

RIVER ST. LAWRENCE SHIP CHANNEL.

The report of Mr. F. W. Cowie, superintending engineer of the work in the St. Lawrence Ship Channel, is of a very interesting nature, containing a short historical account of the improvements in the ship channel, since their beginning.

The project for the channel between Montreal and Quebec had in view a channel of 30 feet depth at the extreme low water depth of 1897, from Montreal to tide water

8-9 EDWARD VII., A. 1909

at Batiscan above Quebec, and from Batiscan to Quebec at extreme low tide. The width contemplated was a minimum of 450 feet in the straight portions and from 550 to 750 feet in the bends. An anchorage was also provided for Lake St. Peter forming part of the river. The project of the work below Quebec had in view a 30 foot channel at low tide at the St. Thomas Flats and at Beaujeu Bank everywhere, 1,000 feet wide.

The 30-foot channel was completed from Montreal to Batiscan in 1906 and is now in use. The highest water in 1907 was 38 feet 3 inches and the lowest 31 feet.

The work remaining to be done is about two and a half miles of shale rock dredging at Cap à la Roche; about one mile at Grondines; about one mile at St. Augustin bar; about one mile of widening at Ste. Croix and nine and a half miles of widening in Lake St. Peter. Cap à la Roche work will take from three to four years to complete, while the remainder to Quebec should be completed at the same time or, in one year later and the widening in Lake St. Peter is expected to be done in 1909. The Beaujeu Bank work will be completed in 1908; the St. Thomas Flats should be finished in 1909 or early in 1910. This channel is limited to a depth of 30 feet by the St. Roch Traverse. For a greater depth than 30 feet at low tide, the work in the north channel from St. Jean, Ile d'Orleans past Cape Tourment and north of Ile aux Coudres, must be undertaken where a depth of 35 feet can be easily obtained.

In view of what has been accomplished and the comparatively early completion of the project referred to, the report gives consideration to the best proposal for the next project in connection with still further improving the channel, by securing a depth of 35 feet. The width and curves having been designed for a much greater available depth than 30 feet, the operation for the greater depth can be carried on without changing the lines of the channel or the aids to navigation.

It is pointed out that the plant for use below Quebec is in every way suitable for the work. For the channel above Quebec, two or three new elevator dredges, the same number of tugs, one stone lifter and the necessary scows will make the ship channel plant ample to undertake the 35-foot channel.

The progress of the work in the past has been satisfactory and the plant is unique in fitness and economy.

From 1889 to 1899, ten years, the expenditure averaged \$130,000 per annum and the quantity dredged 350,000 cubic yards; from 1899 to 1904, five years, the average expenditure was \$515,000 and the excavation, 3,500,000 cubic yards annually; from 1904 to 1907, four years, the expenditure amounted to \$530,000 per annum and the dredging to 3,700,000 cubic yards. During the past fiscal year 1907-8, the expenditure on dredging plant and dredging, amounted to \$657,548.44 and the quantity removed to 4,831,875 cubic yards.

The most difficult section of the channel to dredge is at Cap à la Roche and Cap Charles where the material is principally all shale rock and the whole bottom is covered with boulders up to thirty and forty tons in weight, necessitating the use of stone lifters.

It is pointed out in the report that dredging of a channel consisting of the displacement only, of the material, from a place where it is taken to a point opposite, does not lower the water level. Great care was taken with regard to dumping dredged material so as to actually raise the water in places and cause the current to run straighter.

SESSIONAL PAPER No. 21

The capacity of the channel for navigation is dealt with, showing among other important facts, that with the present available depth of 30 feet at the lowest stages of the river and a greater depth in the first half of the season, ships of 15,000 tons may freely navigate the river.

The department established a telephone service between Montreal and Crane Island with night and day operators. The service has been useful in giving information as to the whereabouts of vessels and in signalling vessels. The service has also been used in connection with the dredging operations when it was necessary to communicate with the shops at Sorel and with the superintending engineer at Montreal.

The 35-foot channel was commenced in November, 1907; but the real beginning will not take place until the Cap à la Roche channel is completed for low tide.

The channel requiring improvement covers a length of seventy miles and the length completed to 30 feet low water depth is fifty-nine miles, leaving eleven miles to dredge in order to make the 30 feet available at all stages of the tide.

The great excavation works of the world are:—the Suez canal, the Panama canal and the St. Lawrence River Ship Channel. Reference is made in the report of Mr. Cowie to the excavation in these works and showing that of the 70,000,000 cubic yards in the St. Lawrence River Ship Channel estimated at the outset to be dredged, 56,000,000 at the end of the fiscal year of 1907-8 had been successfully dredged. During the last fiscal year, 4,800,000 yards, at a cost of less than 10 cents per cubic yard, had been dredged.

The new steel twin screw hopper hydraulic dredge *Beaujeu* (No. 8), built at Sorel, was put in the hands of the operating branch and taken to St. Thomas, Montmagny, and worked until November 15; it was then put in winter quarters at Sorel. A full description of this dredge and all the dredging plant is given in the report of Mr. Cowie.

Interesting and instructive tables have been prepared by the officers under the superintending engineer and form part of his report. They are, first, the average depth of water from 1890 to 1906 in the channel when it was 27½ feet in depth and the average depth in the channel for 1907 at its present depth of 30 feet; second, the total cost of the dredging and plant to March 31, 1908; third, a table showing number of miles of the contracted part of the River St. Lawrence in divisions, the number of miles requiring dredging, the length dredged in 1907, the total length dredged and the number of miles yet to be dredged to complete the 30-foot channel; fourth, a table showing the total number of cubic yards dredged and the number of cubic yards yet to be dredged in divisions 3, 4 and 5. An abstract is also given of the work of the dredging fleet and a detailed classification of the disbursements for the fiscal year.

Winter navigation has for many years, been dealt with by the department and reports upon the subject have from time to time appeared in the annual reports. The report of the work of the ship channel tug *Lady Grey* during the season of 1907, makes an addition to the records of the department in connection with icebreaking and movements of the steamers. The work of the steamer is given in detail in the report of Mr. Cowie, and need not be repeated here further than to indicate that the vessel did the work successfully and without any mishap or damage to herself.

8-9 EDWARD VII., A. 1909

The sweeping of the channel was carried on during the whole season of 1907 and no obstruction of any serious nature was found. The semaphore service was started on May 20. The report on the ship channel forms Appendix No. 3 to this report.

SOREL SHIPYARD.

The work at Sorel shipyard was carried on by the employment of a working force, averaging 641 men, during the fiscal year, under the control of G. J. Desbarats, director of the shipyard. The work consisted of the construction of a tug for the upper lakes to be used in connection with building and attending lighthouses, the building of a powerful dipper dredge capable of excavating solid shale rock at Cap à la Roche in the St. Lawrence river ship channel, also some preliminary work was done in building another dipper dredge to be a duplicate of construction number 19. A floating workshop with a scow 90 feet by 25 feet were built and two lodging scows to serve as sleeping quarters for the men working on tugs and dredges.

The repairs to the ship channel fleet were as usual made to dredges, tugs, scows, coal barges and to vessels employed in the maintenance of lights and hydrographic surveys on the St. Lawrence river.

Ten cabins for large and small signal stations were built and flag masts for twelve stations.

Improvements were made in the property of the shipyard by the erection of two buildings; one 170 feet long by 35 feet wide and the other 100 feet long and 30 feet wide. The larger building is occupied as a storeroom, workshop and a moulding loft, the loft running the whole length of the building on the second floor; the other building is used for storing patterns of castings. The buildings of the shipyard were painted and necessary repairs made.

The report of Mr. Desbarats forms Appendix No. 16 and is accompanied by a financial statement showing the expenditure to have been \$1,049,859.41 for the fiscal year.

ST. LAWRENCE RIVER ROUTE.

The reports relating to lighting, buoying and dredging the St. Lawrence river from year to year have shown many important improvements. The effect of these improvements is seen in the use of the St. Lawrence route by larger and deeper draught vessels than formerly. It is also very noticeable that insurance rates on imports and exports and hulls of vessels, are much lower than formerly. The question of the importance of the improved aids to navigation, in the commerce of the country which finds its way via the St. Lawrence route, will probably, in the near future, appear in a special report.

LIGHTHOUSE BOARD.

Five meetings were held during the fiscal year and applications and recommendations for aids to navigation in the provinces of British Columbia, Quebec, Manitoba, Nova Scotia, New Brunswick and Ontario were considered. In considering the applications, each one was discussed separately and those most urgent for the mariner in his hour of need were recommended for approval.

SESSIONAL PAPER No. 21

The new aids, approved and put under construction or completed, will be found described in the reports of the chief engineer, Commissioner of Lights and in the list of buoys and beacons.

HYDROGRAPHIC SURVEYS.

The hydrographic survey work is in charge of Mr. Wm. J. Stewart, and his report forms Appendix No. 15 to this report.

The work done during the year comprises surveys made on the St. Lawrence river, Lake Superior, British Columbia, Lake of Two Mountains in the Ottawa river and Lake St. Francis in the St. Lawrence river. Some work was done at Key Inlet, Georgian bay, with a view of establishing aids to navigation.

Charts Nos. 9, 10, 11, 12, 13, 14, 15 and 16 of the St. Lawrence river were issued during the year making a total of sixteen charts altogether issued to the public. Charts of Pigeon river to Thunder Cape on Lake Superior, were also published. During the winter of 1907-8, charts of Lake St. Louis and Orignaux Point to Cacouna Island, on the St. Lawrence river, were completed, also a preliminary photo-lithographed chart of the entrance to Prince Rupert harbour, British Columbia, of the work of 1906, was issued. Some further blue prints of additional work were also issued.

Advantage was taken of an opportunity to detail an officer and party to make an extended series of observations for magnetic declination and incidently for latitudes and azimuths. As a result, magnetic observations were obtained at four places in the vicinity of the Saguenay river, five places upon the north shore of Lake Superior and seven places along the St. Lawrence river between Cornwall and Montreal; the result will add very materially to the knowledge of the workings of the Mariners Compass.

SABLE ISLAND.

The annual report of R. J. Boutilier, Superintendent of Sable island, was included in the report of the agent of the department at Halifax. No wrecks nor casualties of any kind occurred during the year and this appears to be unusual in the history of Sable island. A new surf boat was added to the number of boats, early in the year. The island was regularly patrolled during the year. Numerous repairs were made to the buildings on the island.

All the farming operations were carried on with a fair measure of success. The season being better than the average, a good supply of wild hay was secured for the horses.

At the date of report, January 3, 1908, there were on hand seventy head of horned cattle, thirty trained ponies, three imported stallions, five mares and two hundred wild ponies. There were shipped from the island forty-six wild ponies and forty-five barrels of cranberries.

The population of the island, that, of course, consists of the officers of the humane establishment, who are also lightkeepers and their families, numbered forty-two.

LIGHTSHIPS.

The lightships under the control of the Dominion are the *Anticosti*, *Red Island*, *White Island*, *Restigouche* and *Prince Shoal* lightships in Quebec; the *Lurcher* and the *Barrington* lightships in Nova Scotia. the *Miramichi* lightship in New Brunswick,

8-9 EDWARD VII., A. 1909

the Fraser River lightship in British Columbia and two lightships in Lake St. Louis above Montreal. These lightships are anchored in places very much exposed and much difficulty has been experienced in maintaining the lightships *Anticosti* and *Lurher*, in position. Experiments have been made from time to time with anchors, in order that the best holding anchor for the ground in each locality might be determined. The frequent storms in these exposed places have been the cause of the lightships dragging their anchors.

The Miramichi River lightship, anchored in the Horseshoe, off the mouth of the Miramichi river, has not given any trouble in this line owing to the comparatively sheltered position of the lightship.

The lightships have received the usual repairs and overhauling. The *Anticosti* and *Lurher* lightships have, on the occasions of dragging their anchors, reached ports under their own steam.

INSPECTION OF DOMINION STEAMERS AND FOG ALARMS.

The inspection of the Dominion steamers and fog alarms was made by C. Thomson-Schmidt, Inspector of Government Steamers and Fog Alarms. He has reported on the work of inspection. No accidents occurred in the engine department of the steamers or fog-alarms during the year. Mr. Schmidt's report is appended to the report of the chief engineer.

INSPECTION OF LIGHTHOUSES.

The lighthouse stations were inspected as usual by the inspector in each lighthouse district and the usual supplies were delivered.

BUOYS AND BEACONS.

As usual the buoy service has received careful attention by the department, the numerous bays, inlets, rivers, lakes, harbours and other navigable waters constantly require supervision and additional aids to navigation. The substitution of gas buoys for other kinds of buoys continued throughout the year, and, in some instances, combined gas and whistling buoys and combined gas and bell buoys have been established. The expenditure for the fiscal year ending March 31 last, amounted to \$143,257.64.

Several new localities have been buoyed during the past year by placing gas buoys, spar and other buoys in position. The districts now buoyed number about 380 and the buoys established about 4,300, and the contracts 180.

The contract system has been found to work most economically but not always as efficiently as desirable. The buoys were removed in many localities, in the maritime provinces, by drifting ice after they had been placed. The contractors neglected in some cases to provide new buoys promptly or to replace the removed buoys, consequently complaints reached the department. The contractors were directed to restore the buoys and a special inspection was made of the localities where the delay had occurred.

SESSIONAL PAPER No. 21

The expenditure in connection with the buoy service in the different provinces or divisions during the last fiscal year was as follows :

Nova Scotia..	\$36,833 50
Quebec..	54,847 96
Ontario..	12,135 71
New Brunswick..	23,212 77
Prince Edward Island..	3,466 97
British Columbia..	12,760 73
	<hr/>
	\$143,257 64

LIST of Buoys maintained by the Department of Marine and Fisheries in Canadian Waters in 1907.

ONTARIO.

	No. of Buoys.		No. of Buoys.
Amherstburg, including Bois Blanc..	44	Parry Sound, gas-buoys (one with bell)	8
Bay of Quinte (two contracts).. . .	19	Pembroke..	23
Bears Rump..	1	Pointe au Baril, beacons..	15
Big Duck island, bell-buoy..	1	Pointe au Baril, buoys..	4
Blind river..	4	Penetanguishene..	10
Byng inlet..	7	Port Arthur, gas-buoys..	3
Collingwood..	14	Port Rowan..	12
Clapperton channel..	9	Rainy river, beacons, pairs..	11
Georgian bay..	13	Rainy river, buoys..	14
Georgian bay, gas-buoys..	4	River Thames..	8
Goderich..	5	Rondeau..	6
Green shoal..	1	St. Lawrence river, Montreal to Kings-	
Grecian shoal..	1	ton, spars..	84
Gananoque..	3	St. Lawrence river, Montreal to Kings-	
Hawkesbury..	15	ton can-buoys..	13
Kaministiquia..	9	St. Lawrence river, Montreal to Tren-	
Lake Erie, gas-buoys..	2	ton, gas-buoys..	42
Sturgeon river..	26	Above Trenton, gas-buoys..	7
Lake of the Woods, including bell-buoy.	115	Sault Ste. Marie..	21
Lake Simcoe..	5	Sault Ste. Marie, canal approaches..	25
Lake Superior, including bell-buoy.. .	8	Seine river and Grassy lake, piles.. .	30
Little Current..	8	Seine river, buoys..	10
Lone rock, gas and bell-buoy..	1	South Baymouth..	4
Midland..	7	Stokes bay..	6
Murray canal and Presqu'île bay.. . .	23	Surprise shoal, bell-buoy..	1
Lake Temiskaming..	3	Temagami lake, 4 beacons and.. . . .	31
Napanee..	14	Trenton..	13
Niagara, bell-buoy..	1	Victoria island, Lake Superior.. . . .	3
North Sisters rock..	4	Waubashene..	37
Orillia..	18	Winnipeg river..	13
Pancake shoal, bell-buoy..	1	Saugeen river..	8
Parry Sound..	31	Sturgeon river..	26
Campbells rock..	1		

QUEBEC.

Agnes..	1	Cock point..	1
Amherst harbour..	8	Chaudière basin..	7
Anse à Gascons..	1	Cape Despair..	1
Anse à Beaufile..	1	Douthé's point..	1
Barachois de Malbaie..	1	English bay..	3
Bonaventure..	3	Eschourie rock..	1
Cap Chat..	1	Fox river..	1
Cape Cove..	1	Gaspe..	6
Cap Meule..	1	Grand Entry..	17
Carleton point..	1	Griffin cove..	1
Chicoutimi..	15	Gros Cap-aux-Os..	1

List of Buoys maintained by the Department of Marine and Fisheries, &c.—*Con.*

QUEBEC—*Con.*

	No. of Buoys.		No. of Buoys.
House harbour, Magdalen islands..	6	Richelieu river, St. Antoine to Cham-	
Lake Temiskaming, viz.—		bly..	35
Schooner island..	3	Richelieu river, above St. Johns..	21
Opemicon Narrows..	3	Rigaud river..	7
Montreal river..	3	Rivière à la Pipe, Lake St. John..	8
North Temiskaming..	9	Rivière des Prairies..	10
Lake St. John—		Ste. Adelaide de Pabos..	1
River Ashuapmuchuan..		Ste. Anne river..	1
River Mistassini..		St. Thomas..	8
River Peribonka..		St. Godfroy..	1
Roberval harbour..		St. Lawrence river, between Platon and	
25 beacons and..	110	Montreal, gas-buoys..	57
Little river west..	1	St. Lawrence river, between Platon and	
Lachine rapids..	7	Montreal, unlighted buoys..	202
Maria..	1	Serpent reef..	1
Matane..	3	St. Placide..	52
Mont Louis..	1	Maintained by Quebec agency, gas-	
New Richmond..	3	buoys..	27
North channel, Island of Orleans..	10	Maintained by Quebec agency, un-	
Nouvelle..	2	lighted buoys..	45
Paspebiac..	1	Maintained by Quebec agency below	
Pentecost..	1	Quebec, bell-buoy..	1
Perceé..	2	Maintained by Quebec agency below	
Port Daniel..	1	Quebec, whistling-buoy..	1
Portneuf..	9	Petite Rivière East..	1
Restigouche river..	10	Ville Marie (Lake Temiskaming)..	2
Richelieu river, balises..			

NEW BRUNSWICK.

Bathurst..	26	Neil harbour..	1
Baie Verte and Port Elgin..	36	Nappan river, 24 stakes and..	3
Bay du Vin..	12	Northwest arm, Miramichi..	16
Beaver and Blacks harbour..	9	Northeast arm, 24 stakes and..	8
Black brook, Miramichi river..	3	Ox island, St. John river..	5
Black Lands gully..	12	Petit Rocher..	2
Buctouche..	22	Pisarinco..	2
Buctouche stakes..	34	Pokemouche, number of bushes..	7
Buctouche river, bushes..	200	Quaco (maintained by C. G. S.)..	3
Bartibogue..	13	Richibucto and Albion..	33
Campobello..	10	Richibucto, Rexton and Browns yard.	30
Caraquet..	21	Restigouche river, gas-buoys..	6
Cocagne, stakes, 30..	11	Shediac..	18
Dalhousie and Restigouche..	10	Shediac, north of island, 20 bushes and.	2
Digdequash..	5	Shippigan, 17 pickets..	20
Dipper harbour..	3	St. Andrews..	13
Dorchester..	3	Ste. Croix ledge..	11
Grande Anse..	4	St. John river..	77
Grand Lake and Salmon river bushing.	73	St. Louis, 15 bushes..	12
Grand Manan, 1 spindle and..	28	St. Simon, Bay Caraquet..	4
Great Shemogue..	7	Tabusintac..	18
Hatfield point, bushes..		Tracadie, South Gully, 30 bushes and..	5
Harvey..	7	Tracadie, 105 bushes, North Gully..	11
Kouchibouguac and Black river, bushes		Tynemouth creek..	3
Lepreau..	3	Washademoak, 147 bushes and..	2
Letite and Back bay, 1 spindle and..	14	Waweig river..	2
Little Shemogue, 1 beacon and..	5	West Isles, 4 spindles and..	23
Little Shippigan..	12	Maintained by agency—	
Magaguadavic..	13	(gas-buoys)..	1
Maquapit and French lakes, 20 stakes		(gas and bell, combined)..	3
and..	1	(gas and whistling, combined)..	10
Miramichi, 9 winter buoys, 1 lightship		(can and conical buoys)..	23
and..	18	(whistling buoys)..	7
Miscou..	8	(bell-buoys)..	15
Musquash..	7	(bell boat)..	1
Negunac..	21	(lightships)..	2

SESSIONAL PAPER No. 21

LIST of Buoys maintained by the Department of Marine and Fisheries, &c.—*Con.*

PRINCE EDWARD ISLAND.

	No. of Buoys.		No. of Buoys.
Bay Fortune..	3	Little channel..	3
Beach point..	3	Montague..	9
Bedeque..	11	Murray harbour..	41
Brae harbour..	5	New London..	9
Brudenell river..	4	Orwell and Vernon river, 36 bushes..	6
Cardigan, Lower..	6	Pinette, number of bushes..	5
Cardigan, Upper..	12	Port Hill..	12
Cascumpec, 12 stakes..	14	Pownal..	7
Charlottetown, 20 stakes..	21	Rollo bay..	3
Cove head..	3	Rustico..	5
Crapaud stakes and..	5	Savage harbour..	2
East river (Hillsboro')..	17	Souris..	4
Egmont bay..	12	St. Peters harbour..	10
Egmont south, 8 stakes and..	2	Summerside..	10
Georgetown..	14	Tracadie..	7
Geose harbour..	2	West point..	1
Grand river, 1 beacon and..	12	Wood island..	5
Grand river, lot 14..	8	Maintained by agency (signal buoys)..	4
Indian rocks..	1	Maintained by agency (conical).. . . .	4
Malpeque..	16	Maintained by agency (gas buoys).. . .	5
Mimingosh..	6	including Zephir rock.	

NOVA SCOTIA.

Alvo at harbour..	6	Ketch harbour..	6
Apple river..	8	L'Ardoise..	5
Arichat..	20	Lahave..	12
Argyle river and sound..	9	Little Narrows..	10
Avon river..	6	Little Dover..	9
Amherst Basin..	4	Little Bras d'Or..	2
Barrington..	31	Liverpool..	3
Bear river..	11	Lockeport..	6
Beaver harbour..	8	Lunenburg..	8
Blandford..	5	Lunenburg, back cove..	9
Bridgewater..	10	Lunenburg, middle south..	16
Brule..	5	Louisburg..	7
Canning or Habitant river..	6	Liscombe..	4
Canso and St. Andrews passage.. . . .	31	Mabou..	19
Cape Negro or Northeast harbour.. . .	17	Mahone bay and Chester..	12
Cariboo..	6	Main-à-Dieu..	6
Chester..	25	Margaree harbour..	9
Cheticamp..	12	Merigomish..	6
Chezzetcook and Petpiswick..	6	Marie Joseph..	13
Christmas island and Barra strait.. . .	11	Monsellier..	10
Clarks Cove, West bay..	3	Jegogin harbour..	7
Clarks harbour..	17	McKinnon harbour..	4
Cockerwit pass and Woods harbour.. . .	20	Musquodoboit..	7
Cooks cove, Toby cove..	5	Martins Brook..	6
Calf island bay..	5	Metighan river..	2
Crow harbour..	3	Northport..	11
D'Escousse and Lennox passage.. . . .	27	North Sydney..	5
Digby and Annapolis, 5 winter buoys.	8	Neils harbour..	1
Dover..	4	Parrsboro'..	4
East Dover..	3	Petit de gras..	11
East bay, Bras d'Or..	8	Pictou..	6
Fourchu harbour..	11	Pope's harbour..	3
Great Bras d'Or..	8	Port Felix..	11
Gillis point, Boulaceet..	1	Port Hood..	7
Guysborough..	3	Port Le Tour..	15
Glace bay..	4	Port Melville..	9
Hay cove..	14	Port Morien..	2
Harbour au Bouche (6 stakes).. . . .	4	Port L'Hebert..	12
Ingonish, South bay..	7	Pubnico..	18
I-aacs harbour..	12	Pugwash..	9
Indian harbour..	4	Prospect, Lower..	10
Jeddore..	11	Port Mouton..	5
Judique..	1	Port Bickerton..	3

LIST of Buoys maintained by the Department of Marine and Fisheries, &c.—*Con.*

NOVA SCOTIA—*Con.*

	No. of Buoys.		No. of Buoys.
River John (stakes)	3	Three fathom harbour	5
Roseway	3	Tidnish	5
St. Anns	5	Tusket (two contracts), (3 spindles) ..	30
St. Mary river	8	Upper Prospect	4
St. Mary river, up to Sherbrooke ..	18	Wallace	15
St. Peter's bay	16	West bay	3
St. Peters inlet	10	West Dublin and Crooked channel ..	13
Sambro	12	Westport	3
Shag harbour	13	Weymouth	13
Sheet harbour	9	Whitehead	9
Shelburne	25	Yarmouth	50
Ship harbour	9	Maintained by agency—	
Ship rock	1	(whistling buoys)	12
Shulee	8	(bell-buoys)	30
Smith's island	1	(conical and can-buoys)	182
Sydney	2	(gas-buoys)	3
Shad bay	3	(combined gas and bell-buoys) .. .	4
Sober island to Ecum Secum	21	(combined gas and whistling) .. .	24
Tangier	4	(light vessels)	2
Tatamagouche 46 stakes and	18	Submarine Bell signal stations .. .	3
Terrence bay	3	Submarine Bells attached to gas-buoys.	3
Tor bay	19		

LIST of Buoys in the Waters of British Columbia.

(GAS-LIGHTED BUOYS EXCEPTED.)

Name of Buoy.	Position.	Description.
Hesquiat	Fairway harbour entrance	Black and white steel whistle, ver- tical stripes.
Half-tide rock	Hecate passage, Clayoquot sound .. .	Red platform ball.
North bank	"	Black platform drum.
Vargas rock	"	Red platform ball.
Meares spit	Deception channel	Black platform.
Stubbs spit	Stubbs spit	"
Browning passage	West end of pass	Red and black H.B. spar.
"	North shore bank	Black spar.
"	Middle bank	Red spar.
Hankin rock	Mosquito harbour	Red and black platform.
Round island (north)	Round island bank	Black spar.
" (south)	Templar channel bank	Red spar.
Templar channel	Village island	Black drum, steel can.
Amphitrite point	Carolina channel, Barkley sound .. .	Red steel whistle.
Sutton rock	Ucluclet harbour	Red and black H.B. platform.
Rosedale rock	Race rocks, Juan de Fuca strait .. .	Black steel can.
Whale rock	Esquimalt harbour	Red and black H.B. spar.
Patterson rock	"	Black platform.
Canteen	"	Red platform.
Channel rock	Pelly islet, Victoria harbour	Black ball platform.
Songhies rock	Songhies point, Victoria harbour .. .	Black spar.
Hospital rock	Marine hospital	Black ball platform.
Johnstone reef	Haro strait	Black steel can.
Darcy shoal.	Darcy island, Haro strait	"
Sydney split (east)	Sydney island, Sydney channel	"
" (west)	"	Red steel conical.
Sydney wharf (south)	Shoal, Sydney wharf, Vancouver island	Red spar.
" (north)	"	"
Sydney rock	Rock	Red platform.
Colborne passage (south)	Colbourne passage	Black drum platform.
" (north)	"	Red ball platform.
Celia reef	Shute passage	Red steel conical.
Entrance point (Kelp rock)	Satellite channel	"

SESSIONAL PAPER No. 21

LIST of Buoys in the Waters of British Columbia.—*Con.*

(GAS-LIGHTED BUOYS EXCEPTED.)

Name of Buoy.	Position.	Description.
Batt rock.....	Ganges harbour	Black steel can.
Horda rock.....	"	Black ball platform.
Benmohr rock.....	Trincomali channel.	Red and black ball H.B. platform.
Governor rock	"	Black ball platform.
Victoria rock.....	"	Red and black H. B. steel can.
Virago rock	Porlier pass.....	Black spar.
Porlier Pass fairway.....	"	Black and white steel bell, vertical stripes.
Grappler reef	Houston passage	Black steel can.
Indian reef.....	Shoal islands, Stuart channel.....	"
False reef.....	Stuart channel.....	Red and black H. B. steel can.
White rock.....	Trincomali channel.....	Red steel conical.
Southeast.....	False narrows.....	Red spar.
Middle.....	"	"
East.....	"	Black spar.
West.....	"	"
Rosenfeld reef.....	Strait of Georgia.....	Black steel Cage can.
Gossip reef	Active pass.....	Black steel bell.
Sandheads	Channel across Sandheads.....	Four black steel conical.
Point Grey fairway	Burrard inlet.....	Eight red steel conical.
First narrows	South side of Narrows.....	Red steel bell.
Burnaby shoal.....	Vancouver harbour.....	Red spar.
Reef point	Strait of Georgia.....	"
Welcome pass	Welcome point.....	"
Tattenham ledge.....	" pass.....	"
Snake island reef.....	Snake island.....	Red steel conical.
Horsewell reef.....	Horsewell bluff.....	Red steel conical.
Clarke rock.....	Inner channel.....	Black platform.
Entrance.....	Nanaimo harbour.....	Black triangle platform.
Gallows point.....	"	Red ball platform.
South channel.....	"	Black diamond platform.
Middle bank	"	Red ball platform.
South channel (west).....	"	Black diamond platform.
Satellite reef.....	"	Red ball platform.
Middle bank (southwest).....	"	Red spar.
" (west).....	"	"
Carpenter rock.....	"	White ball platform, remainder black.
Mill stream.....	"	Black platform.
Passage rock.....	New Castle island passage.....	"
Departure bay reef.....	Departure bay.....	Red platform.
Hornby wharf reef.....	Lambert channel.....	Black spar.
Dorcas rock.....	Dorcas point, Vancouver island.....	"
Reef, bluff (south).....	Baynes sound.....	Red triangle steel conical.
" (west).....	"	Red steel conical.
Village point.....	"	"
Kelp bar crossing (west).....	"	Red spar.
" (east).....	"	"
Atrevida reef.....	Malaspina strait.....	"
North reef.....	North end, Texada island	Black spar.
Cortes island.....	Baker passage.....	Red steel conical.
Whaleton rock.....	Whaleton bay	Red spar.
Siwash rock	Johnstone strait.....	Black spar.
Ripple reef.....	"	"
Swan rock.....	Addenbrooke point, Fitzhugh sound.....	"
Walbran rock.....	Fisher channel.....	Red and black steel can.
Bloxam bank	Telegraph passage, Skeena river.....	Black spar.
Centre bank.....	Skeena river.....	Red steel nun.
Hazel point.....	Middle passage, Skeena river.....	Red spar.
Casey point.....	Prince Rupert harbour.....	Red steel conical.
Tugwell reef.....	Metlakatla	Black spar.
Harbour channel (west).....	"	Black platform.
" (east).....	"	"
Sparrowhawk rock	Cunningham passage	Red and black H. B. steel can.
Hankin reefs.....	"	Red platform.
Dodd passage.....	Port Simpson.....	Black spar.
Harbour reefs.....	"	Red steel conical.

8-9 EDWARD VII., A. 1909

LIST of Gas Lighted Bell and Whistling Buoys established in British Columbia, 1907-8.

Name of Buoy.	Position.	Description.
Kestrel Rock.....	Gas Buoy..	Prince Rupert.
Spire Ledge.....	"	"
Barrett Ledge.....	"	"
Ellinor Rock.....	"	Charham Sound.
Alford Reef.....	"	"
Hodgson Reef ..	Gas and Whistle.....	"
Skidegate Bar.....	"	Hecate Straits.
New England Rock.....	"	"
Kyuquot Bar.....	"	"
Vancouver Rock ..	"	Milbank Sound.
Dall Patch.....	"	"
Haddington Reef.....	Gas and Bell.....	Broughton Straits.
Comox Bar.....	"	Gulf of Georgia.
Sturgeon Bank.....	Gas, Whistle and Bell.....	"
Swiftsure Bank.....	"	Off Juan de Fuca Straits.

- SPARE Buoys. Agency, Marine and Fisheries, Victoria, B.C., June 9, 1908.
- 2 10-foot platform buoys.
 - 1 9-foot platform buoy.
 - 8 Steel can buoys.
 - 3 Steel conical buoys.
 - 3 8½-foot gas buoys.
 - 3 9-foot gas and whistling buoys.

OIL FOR USE OF LIGHTHOUSES.

The department invited tenders for lighthouse oil and the tender of the Canadian General Supply Company, Limited, was accepted. A contract was entered into and 152,261 gallons were purchased from the company for the lighthouses in the Dominion excepting British Columbia.

The specification of the oil was the same as in former years and required the oil to weigh at 62° Fahrenheit, not less than seven pounds nor more than eight pounds per gallon and to withstand a flash test of 115° Fahrenheit.

Oil of a very much higher grade was required for the dioptric lights and this was purchased in New York. The American oil was made according to the Washington Lighthouse Board specification and about 25,000 gallons were used.

The contract price per imperial gallon for the Canadian oil delivered was as follows :

Delivered at	Per Gal. In Barrels.	Per Gal. In Cases.
Sarnia, Ont.....	16½c.	21c.
Kingston, Ont.....	17½c.	22½c.
Port Dalhousie, Ont.....	17½c.	22½c.
Montreal, P. Q.....	18½c.	23c.
Quebec, P. Q.....	18½c.	23½c.
St. John, N. B.	18½c.	23½c.
Gloucester Junction, N.B. ....	.....	24c.
Newcastle, N. B. ....	.....	24c.
Dartmouth, N.S.....	18½c.	23½c.
Pictou, N.S.	19c.	23½c.
Charlottetown, P.E.I.....	19½c.	24½c.

SESSIONAL PAPER No. 21

Allowance for empties:—Barrels, \$1 delivered at Montreal, Quebec or Sarnia. Cases (containing two cans) 45 cents each case, if delivered in good order.

The American oil cost 23½ cents per wine gallon in New York.

The oil for British Columbia was purchased from the Imperial Oil Company at 25½ cents per imperial gallon, and 13,175 gallons were consumed.

CORRESPONDENCE.

About 38,190 letters were received in the department during the twelve months ended March 31, 1908. The correspondence was carefully examined and replied to as far as necessary. About 20,000 letters were sent out during the same period. Registered letters inclosing cheques sent out by the accountant's branch, forms, reports, circular letters and notices inviting tenders, are not included in the number of letters addressed to this department or sent out.

These forms are numerous and require special attention, as the matters to which they refer are important.

In the records branch of the department, the letters received are carefully examined, entered in the record book, placed on file, and the copy of the reply attached, so that the letters and answers can readily be seen and any subject easily followed up.

MERCHANT SHIPPING.

The total number of vessels remaining on the register books of the Dominion, on December 31, 1907, was 7,528, measuring 698,688 tons, being an increase of sixteen vessels and 44,509 tons register as compared with 1906; of this amount nearly 30,000 tons were transferred from Great Britain. The number of steamers on the register books, on the same date, was 3,007 with a gross tonnage of 471,795 tons. Assuming the average value to be \$30 per ton, the value of the registered tonnage of Canada, on December 31 last, would be \$20,960,640.

The number of new vessels built and registered in the Dominion of Canada during the last year was 392, measuring 38,410 tons register. Estimating the value of the new tonnage at \$45 per ton gives a total value of \$1,728,450 for new vessels.

The list of vessels is published in the report called List of Shipping. In that report is a statement showing the tonnage of each of the maritime states of the world and that Canada ranks tenth in the list of countries, but the registered tonnage of the Dominion is not given, owing to the fact that Canadian shipping is included in the tonnage of Great Britain.

DOMINION STEAMERS.

'MINTO.'

The *Minto* is a single screw steel steamer built in 1899, length 225 feet, beam 32 feet 7 inches, depth of hold 18 feet, net tonnage 372, gross tonnage 1090, indicated horse-power 3,150.

At the beginning of the fiscal year 1907-8, the steamer *Minto* was on the Georgetown-Pictou route making tri-weekly trips until May 4. She then went on the Char-

8-9 EDWARD VII., A. 1909

lottetown-Pictou route where she plied until May 21, when the summer service was resumed by the Charlottetown Steam Navigation Company.

Application was made by the company for the use of the *Minto* while their steamer *Northumberland* was on the slip at Pictou and the *Minto* was plying between Pictou and Charlottetown, from May 25 to 31.

The *Minto* was placed on the slip at Pictou on June 4, and her bottom was painted and she was launched on the 7th of the same month. The ship proceeded to Quebec on the 8th to enter into the service of the Governor General, arriving on June 10. The steamer remained at Quebec cleaning and painting until June 22, and began her trip with His Excellency on board, on the 23rd.

This service was completed on August 23 at Quebec. On August 26, the *Minto* left Quebec for Charlottetown and remained at the latter port until September 9, when she was again put on the slip at Pictou undergoing repairs until October 10. The work of overhauling the steamer and making repairs was continued at Pictou until December 3, when she returned to Charlottetown and entered upon the winter service.

The *Minto* continued on the Charlottetown-Pictou route until January 8, 1908. On the 9th of the same month the *Minto* was placed on the Georgetown-Pictou route but remained only two days on that route. On January 11 the steamer resumed her trips on the Charlottetown-Pictou route, but was compelled in consequence of ice to return to the Georgetown-Pictou route on January 15, 1908, ending winter service March 31, 1908.

Two short interruptions in the winter service occurred during the season, namely, when the ship left Georgetown on February 12, and did not arrive at Pictou until the next day. The other occurred when the *Minto* made a special trip from Georgetown with a load of seed oats to be shipped to the Northwest for seed.

The following statement shows the earnings of the *Minto* for the fiscal year:—

148,075 packages freight, 8,212, 1,700, 2,000 tons.. . . .	\$10,168 79
2,850 passengers.. . . .	4,454 25
1,456 meals.. . . .	728 00
594 berths.. . . .	499 00
	<hr/>
	\$15,850 04
Charlottetown Steam Navigation Company, 9½ days.. . .	412 44
	<hr/>
	\$16,262 48

‘STANLEY.’

The *Stanley* is a single screw steel steamer built in 1888, length 207 feet 9 inches, beam 32 feet, depth 17 feet 9 inches, net tonnage 395 and gross tonnage 914; indicated horse-power 2,540; steam pressure 160 pounds per square inch.

At the beginning of the fiscal year 1907-8, the *Stanley* was performing mail service and carrying passengers between Georgetown and Pictou and making tri-weekly trips. The service was continued on this route until May 3, 1907, when the steamer was transferred to the Charlottetown-Pictou route and continued on that route until May 20.

SESSIONAL PAPER No. 21

The *Stanley* then began the buoy service around the coast of Prince Edward Island and part of New Brunswick. This service consists of placing large automatic and gas buoys and was completed on June 7.

It was decided to send the *Stanley* to Scotland to have extensive repairs made in the shipyard in which she was built.

The ship had been in the winter service between Prince Edward Island and the mainland since the year 1888, and required extensive repairs and new boilers. The *Stanley* left Georgetown on June 16 and arrived at Glasgow on the 25th of the same month. She was immediately placed in the hands of the shipbuilders and was undergoing the repairs until November 9. On November 12, the steamer left Glasgow for Charlottetown, but in a gale on November 14 the steamer shipped so much water that the pumps became choked and the vessel was put back to the nearest port. It was necessary to procure more coal at Moville and on November 19 she again left for Charlottetown and arrived there on December 1.

On December 7, the *Stanley* began the winter service between Charlottetown and Pictou, N.S. The ship remained on that route until January 8, when she was transferred to the Georgetown-Pictou route and continued between Georgetown and Pictou until March 31.

Only three interruptions occurred to the regularity of the ship's trips. One when the vessel was from February 12 to 13, on the trip from Georgetown to Pictou, the other, on another trip, the *Stanley* was from March 11 until 13th fast in the ice most of the time. On March 1, a special trip was made for the purpose of carrying seed oats for the Northwest from Georgetown.

The following statement shows the earnings of the *Stanley* for the fiscal year.

139,882 pkgs. freight, 7,629, 1,110, 2,000 tons.. . . .	\$ 9,805 70
3,053 passengers.. . . .	4,393 50
2,108 meals.. . . .	1,054 00
747 berths.. . . .	640 00
	<hr/>
	\$15,893 20

‘ MONTCALM.’

The *Montcalm* is a twin screw steel vessel, length 245 feet, beam, 40 feet 6 inches, depth of hold 15 feet 7 inches, net tonnage, 3,508; gross tonnage 550. Indicated horsepower 4,350 at steam pressure of 220 pounds.

The *Montcalm* left Quebec for a cruise in the entrance of the Gulf of St. Lawrence and Straits of Cabot, early in the spring of 1907. She assisted incoming vessels through the ice and supplied valuable information to shipping through the Marconi Wireless Telegraph as to location, state, movement and direction of the ice, &c.

The vessel was employed for nearly two months transferring mails to and from ocean vessels off North Sydney; she then went to Pictou to take down the necessary supplies and Marconi operators with equipment for opening of Marconi wireless telegraph stations on the south and north coasts of the Gulf of St. Lawrence, Straits of Belle Isle as well as off Cape Race. She then returned to Quebec, was docked and resumed her lighthouse work.

8-9 EDWARD VII., A. 1909

The vessel met with a serious accident on November 22, 1907, while picking up the Marconi operators at Pointe-au-Maurier, by striking an unknown and uncharted rock in Watagheistic Sound. Salvage pumps were installed on board and the *Montcalm* proceeded under her own steam to Quebec and was docked for the winter and complete repairs were made.

‘DRUID.’

The *Druid* is a steel twin screw vessel length 160 feet, beam 30 feet, depth of hold 12 feet 5 inches, net tonnage 149, gross tonnage, 503.

The *Druid* was commanded as usual by Captain Chas. Koenig, superintendent of buoys and inspector of lighthouses for the Quebec district, extending from Portneuf above Quebec to Father Point, a distance of 185 miles.

The *Druid* was constantly employed in placing, keeping in position and taking up numerous gas and other buoys, and maintaining a large number of beacons and day marks.

This steamer towed *Red Island*, *White Island* and *Prince Shoal* lightships to and from their stations and supplied them with coal and other material during the season of navigation. The vessel also transported working men to repair lighthouses and was constantly kept under steam to replace gas buoys or remedy different lights or for any other accident to aids to navigation in the river.

‘EUREKA.’

The *Eureka* left Quebec early in the spring and returned late in the fall. She was employed in embarking and disembarking pilots off Father Point.

The steamer wintered in Louise Basin in Quebec; while there a new deck was put on and a few alterations made which rendered her more efficient for the service. The machinery was overhauled and the ship put in good working order.

‘ARCTIC.’

The *Arctic* is a wooden screw vessel, length 165 feet 4 inches, beam 37 feet 2 inches, net tonnage 518, gross tonnage 762, nominal horse-power 44.

The *Arctic* under command of Captain Bernier, arrived at Quebec on October 19, 1907, from her cruise to the northern regions; she wintered in Louise basin, and the machinery was overhauled and alterations made to the crew's living quarters, also a new powerful windlass was supplied her.

‘CHAMPLAIN.’

The *Champlain* is a single screw steel steamer, length 120 feet, beam 30 feet 3 inches, net tonnage 225, gross tonnage 522.

The *Champlain* was employed during the winter of 1907 as a ferry boat between Rivière Ouelle, Cap-a-l'Aigle, Murray bay and St. Irenée.

The *Champlain* was placed in the dock at Quebec, in June last, and put in first class order for the summer months.

The vessel carried during the year 10,000 passengers, a large quantity of freight, baggage, mail, &c. The receipts for the fiscal year ending March 31, 1908, amounted to \$6,422.28.

SESSIONAL PAPER No. 21

'ARANMORE' AND 'WM. HACKETT.'

The steamer *Aranmore* and tug *Wm. Hackett* were chartered and employed to carry working men and material required at the different stations where lighthouses were constructed. This work could not have been done by the *Montcalm* as she was occupied at other work during a great part of the season.

'ABERDEEN.'

The *Aberdeen* is an iron screw steamer 180 feet in length, 31 feet in breadth and 16 feet deep with a gross tonnage of 674 tons.

This steamer was employed from April 1, 1907, at placing submarine bells off Chebucto Head and buoys up to the 22nd of the same month. The vessel was then placed in dry dock cleaned and painted. Repairs were also made to the machinery and hull. Supplies for Cape Race, Newfoundland and Sable island, were taken on board and the vessel sailed on May 26. She returned to Halifax on June 12, but owing to smallpox being on board, the vessel was compelled to remain at quarantine until June 27. Another trip was made to Cape Race with lighthouse supplies, the vessel sailing from Halifax on July 2. On her return voyage the *Aberdeen* went to Eseuminac, New Brunswick, to land lumber and boilers for the fog alarm. When this work was completed the steamer proceeded to Cape North and landed lumber and boilers for the fog alarm at that place.

Another trip from Halifax, on August 4, was made to Cape North and Hawk Island with lighthouse supplies and the vessel proceeded to East Point, Prince Edward Island and landed a boiler for the fog alarm. The steamer was engaged in conveying supplies to lighthouses on the eastern shore of Nova Scotia until September 19; she then was sent to Prince Edward Island to put out gas buoys at Point Prim and Bedeque bay. From there the vessel supplied lights on the north shore of Cape Breton and was generally employed up to October 23 in supplying lighthouses and buoy work on the western shore of Nova Scotia, and, until November 13, was in the western shore and Bay of Fundy service.

The steamer prepared for a trip to Sable island and was engaged in that service from November 23, returning to Halifax on December 2 with a cargo from Sable island. From that date until the end of the fiscal year the vessel was engaged in loading supplies and delivering them to lighthouses, picking up coast buoys and placing others, recovering buoys which went adrift, general inspection work, placing winter spar buoys and attending to submarine warnings and signals, placing carbide in gas buoys, delivering coal to fog alarms and various other kinds of service.

'LADY LAURIER.'

The steamer *Lady Laurier* is a twin screw steel steamer, length 214 feet, 9 inches, breadth 34 feet 2 inches, depth 17 feet 2 inches, gross tonnage 1,051, and is fitted with Marconi apparatus.

This steamer was engaged in the buoy service from April 2, 1907, along the coast west of Halifax and Bay of Fundy until May 27. Buoys were then loaded for the eastern shore and the service was attended along that shore making a trip also to Sable island. Return trips were made to Halifax for more buoys and materials. On

8-9 EDWARD VII., A. 1909

July 8, the vessel left Halifax with buoys and carbide to recharge the gas buoys. On this trip winter buoys were picked up and replaced by gas and automatic buoys and a trip made to Sable island from which forty ponies were taken to Halifax for sale. On July 22, the *Lady Laurier* attended to submarine bells and continued her trip east as far as Point Aconi. During August and up to September 23, the vessel was employed in an inspection trip attending coast lights on the eastern coast of Nova Scotia, and made a trip to Cape Race, Newfoundland. During October and November, trips were made to the western coast visiting Yarmouth and St. John, attending submarine bells and appliances.

During December the steamer was attending buoys around Cape Sable and Seal island and supplying lights. From January 2 until the end of the month the vessel was employed supplying the lights on the western coast from Halifax to Lockeport. A trip was made within this period to Sable island to get the Sambro gas buoy which had broken adrift; supplies were also landed on the island. From that point a trip was made to the Cape Breton coast for the purpose of picking up buoys which had gone adrift. During February the steamer was engaged filling gas buoys with carbide and endeavouring to recover a gas buoy which had gone ashore, but was unsuccessful. In March, the buoys in Halifax harbour and eastward to Jeddore were attended, also, the eastern coast and gas buoys one of which had gone adrift. A trip was also made during this month to the west on buoy service and arranging the lightship moorings at Barrington, returning to Halifax with several buoys which had gone ashore.

‘ LANSDOWNE.’

The *Lansdowne* is a wooden steamer, 188 feet long, 32 feet wide, 15 feet deep with a gross tonnage of 680 tons. She is employed in the lighthouse and buoy service in New Brunswick.

On April 1, 1907, she left St. John with lighthouse supplies. From that date until September 14, she was employed in supplying lighthouses and the *Lurcher* lightship, with necessary supplies, placing and attending to gas, bell and other buoys, along the coast.

She was out of commission from September 14 to 22, undergoing extensive repairs at St. John.

The *Lansdowne* again went into commission on September 23. After taking in coal and other necessary supplies, she left for Brier island when the main derrick gave way, causing some damage to the pilot house which caused some delay.

On October 2, she left for Yarmouth, Nova Scotia, to attend to the Fairway gas buoy, which had broken loose from its moorings, and after much difficulty, towed it to Yarmouth, where it was cleaned. New moorings were ordered from Halifax which did not arrive for some time after, so the ship left Yarmouth on October 5 and returned on the 19th, but owing to heavy winds was engaged in other work and did not set the Fairway buoy until October 31.

From this date until the close of the fiscal year the *Lansdowne* continued to perform her regular service.

The *Lord Kitchner*, a chartered tug was also employed in the lighthouse and buoy service and rendered assistance to the *Lansdowne*.

SESSIONAL PAPER No. 21

'QUADRA.'

The *Quadra* is an iron steamer employed in British Columbia and is 174 feet in length, 31 feet beam, depth 13 feet 6 inches, gross tonnage 573 tons.

The *Quadra* was engaged in the waters of British Columbia from April 1 to July 8, in connection with gas beacons from Port Simpson to Seymour Narrows. The steamer was on the Marine Railway slip from July 10 to July 18 and from July 19 to August 26 was engaged in buoy and lighthouse service; from September 1 to November 30 she was employed in attending to gas buoys and beacons and from December 1 to January 12 in buoy and light service. From January 14 to March 31, the vessel was under repair.

'MAUDE.'

The ss. *Maude* was chartered on February 27, and was employed in establishing gas beacons up to May 30; from that date to June 10 in picking up naval moorings in Esquimalt harbour. The vessel resumed the work in connection with building gas beacons until July 15. From that date until October 6, she was employed in delivering construction material and supplies to the west coast stations; from October 6 to 17, in landing material for wireless stations; from that date until November 23 in general lighthouse work.

'CASCADE.'

The *Cascade* is a chartered steamer and was engaged from April 1 in buoy service, the conveying of lightkeepers to their stations and transporting fog-alarm and wireless telegraph construction material, coaling fog-alarms and in establishing gas beacons.

'WILLIAM JOLIFFE.'

The ss. *William Joliffe*, a powerful tug, was chartered for the purpose of establishing large gas buoys. She was engaged in this work from September 15 to March 31.

The other steamers of the department were employed in survey, inspection of St. Lawrence river and general service work.

The *Gulnare* was employed in tidal survey work in the Strait of Belle Isle.

The *Bayfield* in hydrographic surveys in Lake Superior.

The *La Canadienne* in hydrographic surveys in the St. Lawrence river.

The *Lilooet* in hydrographic surveys in the waters of British Columbia.

The *Lady Grey*, *Frontenac* and tugs *Eureka*, *James Howden*, *St. Jean Iberville*, *Lac St. Pierre*, *St. Francis*, *Cartier*, *Emelia*, *Champlain*, *Jessie Hume*, *Montcalm* and *Carmelia* were employed in connection with the St. Lawrence River Ship Channel.

The *Shamrock* in the buoy service between Montreal and Quebec.

The *Scout* and *Reserve* in lighthouse and buoy service between Montreal and Kingston. The *Brant* in lighthouse service in Prince Edward Island. The *Maison-neuve* is principally employed in patrolling the St. Lawrence and Ottawa rivers in connection with the buoy service.

The *Rouville* in pilotage service in the St. Lawrence river.

Three chartered tugs were employed in lighthouse construction work in the St. Lawrence river, and one tug in gas buoy service Georgian bay.

8-9 EDWARD VII., A. 1909

The fishing cruiser fleet consists of the following vessels :

The *Canada*, *Petrel*, *Curlew* and *Ostrea* employed in the waters of the maritime provinces, the *Kestrel*, *Falcon*, *Georgia* and *North* in the waters of British Columbia, the *Vigilant* in Ontario waters, the *Princess* in Quebec waters and the *Constance* as a revenue cutter under the control of the Customs Department. The *Lady of the Lake* is employed in Lake Winnipeg in connection with the fish hatchery work.

LIGHTHOUSE TENDER AND BUOY STEAMER FOR GEORGIAN BAY.

Public tenders were asked on March 10, 1908, for the construction of a twin screw steel steamer for the Georgian bay lighthouse and buoy service.

The advertisement was inserted in several Canadian papers. Tenders were also asked from the leading ship building firms in Great Britain.

FOUR TENDERS WERE RECEIVED.

Swan, Hunter and Wingham, Richardson, Limited, Wallsend, England, \$160,966.67.

Vickers Sons & Maxim, Limited, London, England, \$219,360.13.

The Collingwood Shipyard Company, Collingwood, Ont., \$217,000.

Polson Iron Works, Toronto, Ont., \$249,900.

The tender of Swan, Hunter & Wingham, Richardson, being the lowest, was accepted.

When completed the steamer will be 180 feet long between perpendiculars 35 feet breadth, moulded; 17 feet 6 inches depth, moulded; 11 feet draft, speed at least 12 knots an hour.

She will be supplied with Babcock-Wilcox natural draft water tube boilers, electric lights and classed 100 A.1., at Lloyds.

ICEBREAKING STEAMER FOR STRAITS OF NORTHUMBERLAND.

Tenders have been invited and are now receiving consideration for the construction of an icebreaking steamer to carry passengers and freight between Prince Edward Island and the mainland. The specification and plans provide that the steamer shall be of larger dimensions, more powerful, stable and of greater speed than the *Stanley* and *Minto*.

METEOROLOGICAL SERVICE.

There are now 434 stations from which observers report to the central office at Toronto. The increase of stations from last year numbers 11; at 39 of the stations salaries are paid and three observations taken daily and telegraphed to Toronto. These 39 stations are distributed at nearly equal distances throughout Canada and at 49 other points observers receive remuneration for a more or less extended series of observations. Special observations during the summer months are collected at Winnipeg, from 24 stations in the western provinces and with other information from Toronto a bulletin service is maintained throughout the provinces, for which remuneration is allowed. For the special telegraph service seven persons are employed and eighty-

SESSIONAL PAPER No. 21

nine are paid for attending to the display of storm signals. A large number of volunteer observers furnish climatic data used in the preparation of the meteorological reports.

Since the issue of the last annual report, 26 stations have commenced reporting but for various reasons 11 other stations have ceased reporting.

Forecasts have been issued twice daily and 2,306 storm warnings; of the warnings 93·9 per cent were verified.

Inspection was made of the telegraph reporting stations with the exception of Dawson-Atlin and Barkerville. An officer could not be spared a sufficient length of time to visit these outlying districts. Stations, where the highest and lowest temperature and the rainfall are recorded daily, have been occasionally visited for inspection of the instruments.

The monthly weather map, published promptly on the 3rd and 4th of every month shows the meteorological conditions of the month closed, as regards temperature and precipitation and seems to be much valued by agriculturalists and others.

With the double object in view of obtaining climatic data from Canada's north land and of obtaining continuous barometric observations from the northern portions of the continent, six stations lying between H. McMurray, on the Athabasca river and the Arctic coast, will be supplied with full meteorological equipments.

The seismographs at Toronto and Victoria, B.C., have been kept in operation throughout the year. At Toronto, sixty disturbances large and small have been recorded, and sixty-three at Victoria.

The time exchanges with Montreal, Quebec, St. John and Toronto have been carried on as usual and registered on the chronograph in Toronto.

Sun spot observations have been continued at Toronto. A most successful observation of the transit of Mercury across the disc of the sun was obtained at the observatory.

The self recording instruments have been kept in continuous operation throughout the past year. An officer was assigned for magnetic survey duty in the western provinces and it is proposed to extend this survey to the Gulf of St. Lawrence and possibly to the shores of Hudson bay.

The report of the director of the meteorological and magnetic service forms Appendix No. 8 to this report.

CRUISE OF THE GOVERNMENT STEAMER 'ARCTIC' TO HUDSON STRAIT AND NORTHERN WATERS.

The steamer *Arctic*, under command of Captain J. E. Bernier, whose commission was authorized by order of the Governor General in Council on July 23, 1906, began her cruise from Quebec on the 29th day of July, 1906.

The steamer had on board provisions for three years and 530 tons of anthracite coal. The ship's company consisted of nine officers, one Custom House officer, an electrician and a crew of thirty men including engineers and petty officers.

The report of the cruise is published separately from this report and contains information on the movements of the steamer in Hudson strait, Davis strait, Baffin bay, Navy Board inlet, Admiralty inlet, Prince Regent inlet, Lancaster sound, Barrow strait, Melville sound, Lady Ann strait and other Arctic regions.

8-9 EDWARD VII., A. 1909

The *Arctic* went as far west as Melville island, in lat. $76^{\circ} 6' N.$, and long. $106^{\circ} 2' W.$, which place was reached on August 29, 1906. The steamer returned from Melville island and anchored in Albert harbour, Ponds inlet, in lat. $72^{\circ} 40' N.$, and long. $77^{\circ} 58' W.$, on September 9. The return to Albert harbour was made with the expectation of meeting the whaling vessels for the purpose of issuing licences, but as the fleet had not arrived at Albert harbour, it was decided to remain at that point during the winter and resume the voyage north in the spring or summer. The *Arctic* remained in winter quarters until July 27, 1907, and then proceeded north to North Lincoln, lat. $76^{\circ} 20' N.$, long. $81^{\circ} 30' W.$, arriving there on August 12. The return voyage was then made to Port Burwell at the eastern entrance to Hudson strait, where the steamer arrived on September 2, 1907.

Some time was spent in Port Burwell in taking soundings in the inner harbour and in building some day beacons in the inner and outer harbours. A wooden range to show the best anchorage ground was also built. While at Port Burwell the Captain ascertained that navigation is open from July 12 to November 15, on an average. The *Arctic* returned to Quebec on October 19, 1907.

The most important work accomplished by Captain Bernier was the annexing of a number of islands to the Dominion of Canada, raising the Dominion flag, building cairns and depositing documents proclaiming the fact that the land was taken possession of in the name of Canada and in accordance with the granting of the northern islands and lands, the possessions of Great Britain, to Canada.

Whaling licenses were issued to five vessels for the years 1906 and 1907. The whaling vessels were not met with in 1906, as already stated, and licenses were therefore given to the captains and the fees collected for both years. In addition to this, customs duties were collected for articles supplied the natives by the whalers.

The report of Captain Bernier supplies useful information on the fisheries of the Arctic waters and the hunting of narwhals and catching of seals. The right whale is decreasing and the pursuit of whaling has dwindled to a very few vessels sent out by Scotch and American owners. One right whale only was seen by the crew of the *Arctic* during the two summers the vessel was in the Arctic regions. Large numbers of white whales were seen in Navy Board inlet, Admiralty inlet, Prince Regent strait and Port Leopold and Erebus bay. The white whale is generally found in the neighbourhood of small streams and is easily captured. Narwhals were met at the same places as the white whales. The narwhals are captured by the natives for their ivory and oil, and are also used for food.

The walrus are taken in the vicinity of Ponds inlet and on the coast of Baffin land, by whalers, the skins having increased very much in value in recent years.

Large numbers of seals were seen in Jones sound, also in Ponds inlet, Eclipse sound, Navy Board inlet, and they abound in Admiralty inlet. They form the principal food of the natives of Baffin land.

Salmon are found in all rivers in Baffin land, Cockburn island and North Somerset. They are especially plentiful in Salmon river, Ponds inlet, Arctic sound, Milne inlet and Admiralty inlet, all within lat. $72^{\circ} N.$ to 74° , and from 75° to $95^{\circ} W.$ longitude.

Codfish abound in Ungava bay during August, September and part of October,

SESSIONAL PAPER No. 21

and seals are plentiful in the same bay in fall and spring. Salmon and trout are found in all streams.

The islands and lands formally annexed to Canada during the expedition in the year 1908, are Bylot island in Baffin bay, Cornwallis island, Griffiths island, Lowther island and Russell island in Barrow strait and Bathurst island, Byam Martin island, Melville island, Prince Patrick island and Eglinton island in Melville Sound. The extreme western part reached was a point named by Captain Bernier 'Arctic Point,' after the name of the steamer *Arctic*, in latitude $75^{\circ} 0'$ N., and long. $106^{\circ} 02'$ W. In the year 1907, the following places were formally taken possession of in the name of Canada, in Jones Sound, North Lincoln, Grinnell Land, North Kent, Amund Ringnes Land, land formerly named Finlay Land, Graham Land and other divisions of land which will be found enumerated in the report. The islands adjacent to all the islands and lands mentioned are now claimed as Canadian territory. Documents containing records of the proclamation were deposited in cairns.

Some discoveries, of islands not marked on any chart, were made by Captain Bernier and possession taken in the name of Canada. Names were given various unnamed places at which Captain Bernier landed and also to headlands, peninsulas and islands observed by him during the cruise.

The names recorded in the report of Captain Bernier are as follows:—Canada Point on Bylot island was named after the fishery cruiser *Canada*; the point is in lat. $73^{\circ} 22'$ N. and long. $80^{\circ}, 50'$ W.; Baillargee inlet, lat. $73^{\circ} 37'$ N. long. $83^{\circ} 50'$ W. Lord Strathcona inlet; Kackitos Peak, Ekertoo Peak, Sassilook and Berlinguett bays, Brodeur peninsula, Vanasse bay, Prud'homme inlet, Moffet inlet and Levasseur inlet; the peaks, bays, inlets and peninsulas named with the exception of Canada Point are within Admiralty inlet; Gourdeau Point the southern point of Lowther island and Dobell Point, Griffiths island, Edwards Point, Coburg island were also named. An island near Albert harbour in Baffin Land was named Beloil island and a mountain upon which the Canadian flag was raised was named Morin mountain. The flag was raised on the King's Birthday in celebration of the day and as a token of taking formal possession of Baffin Land for Canada.

During the cruise, caches were built at several points and provisions stored for future use, if necessary, in accordance with the custom followed by all expeditions.

Captain Bernier relates some interesting facts in connection with finding provisions, documents and articles left by previous explorers. One of the most interesting incidents was the finding on Beechy island, Erebus bay, the tablet erected in memory of Franklin, by Lieut. McClintock, R.N., who landed in 1858.

The inscription on the marble tablet is in memory of Franklin, Crozier, Fitzjames and their brother officers and companions who perished in the cause of science and service of their country. The tablet was erected where Franklin passed his first Arctic winter. It was lying flat on the ground and the crew of the *Arctic* built a cement foundation and placed the tablet in an upright position. They also painted a head stone which had been erected in memory of three men of the crews of the *Erebus* and the *Terror*. A cairn built by the crew of the *Northern Star* in 1854, was opened and records of the movements of the *Arctic* were deposited therein. This cairn is close to the tablet on Beechy island, 642 feet above the sea level.

8-9 EDWARD VII., A. 1909

Some records of the expedition under A. P. Low, B.Sc., officer in charge of the *Neptune* sent out by the Dominion government in 1903—were also found on Beechy island and a cache left by the commander of the Norwegian vessel *Gjoa* at Port Leopold. This cache being in an open condition a shelter house was built over it.

Interesting and valuable information was obtained from Captain W. F. Milne with regard to the best harbour on the east side of Baffin Land. This harbour is named after the Scotch whaler *Tay* and anchorage can be found in every part of the harbour. A safe course south along the coast from Navy Board inlet in lat. 73° N. long. 81° W., to Black Lead, lat. 65° N. long. 65° W., in Cumberland gulf, is described in the report of Captain Bernier.

Interviews were held with Moravian missionaries at Port Burwell and elsewhere, and valuable information respecting the habits, social condition of the natives and their methods of hunting and fishing, will be found in the narrative of these interviews.

Meteorological observations were recorded by the missionaries and copies were furnished Captain Bernier. A meteorological journal was also kept on board the *Arctic*, together with a record of the thickness of the ice in Albert harbour during the period the steamer was in that harbour. The ice formed on October 20 in the harbour and was 2 inches thick on that date. The harbour ice was 44 inches thick on March 9, and outside the harbour was 65 inches in depth on April 6. The ice broke on July 20 in Albert harbour, and the vessel left for sea on the 27th of the same month.

The physical features of the islands and the mainland are described and information respecting the adjacent waters given. The more prominent headlands and other landmarks are mentioned and several islands, bays, inlets and reefs not indicated on any published charts are specially described.

The ice conditions, from the time the *Arctic* entered northern waters until her return to Belle Isle strait, were carefully recorded. An interesting list of terms of the various forms which the ice assumes during its movements will be found in the report. The effect of the different ice formations, upon the course of the steamer, furnishes information respecting the difficulties of Arctic navigation and the privations and hardships to which explorers and whalers are liable.

Captain Bernier has arrived at a conclusion, from observation and knowledge obtained from others, on the question of open navigation in Hudson strait and bay. The average time of the closing of navigation for the eastern entrance of Hudson strait is about the last of October. The closing of navigation so early is due to pack ice drifting on the coast of Hudson strait. The northern current partly enters the north side of the strait and partly closes on the Labrador coast. This fact is well established by the filling up with ice of the northern harbours and Port Burwell at the entrance of the strait, while the western part of the strait and Hudson bay are free from ice. Hudson bay is never frozen with the exception of a few miles around the margin. Fort Churchill is often open in the first weeks of November and can easily be kept open with a suitable icebreaker.

Port Burwell at the eastern entrance to Hudson strait is described as a good harbour and with aids to navigation will eventually become a harbour of some importance or perhaps a port of call. Soundings were taken of the inner harbour and a few red and black buoys placed.

SESSIONAL PAPER No. 21

Captain Bernier made some extracts from the report of an official visit of the Governor of Newfoundland to Labrador and the extracts are embodied in the report of the expedition of the *Arctic*.

REPORTS OF AGENTS OF THE DEPARTMENT.

The reports of the agents of the department at Halifax, N.S., St. John, N.B., Quebec, Charlottetown, P.E.I., Victoria, B.C., and Montreal were received. These reports contain information relating to the construction of lighthouses, the moving of the steamers under the control of the agents, particulars relating to repairs to lighthouses, the placing of new buoys and maintaining the system of buoys. The works in the agencies where workshops are established are reported upon, also the delivery of lighthouse supplies to the various lighthouses by the agents or superintendents of lighthouses where there are superintendents. Much detailed information is furnished respecting the operations in these agencies. The correspondence between the department and the agents was large for the year 1907. Instructions were given directly to the agents relating to the carrying out of the work and matters of importance which arose in the agencies were referred to the department for decision.

The agent at Halifax is J. Parsons; St. John, F. J. Harding; Quebec, Theo. Beland; Victoria, J. Gaudin; Charlottetown, A. Lord; Montreal, U. P. Boucher. These officers have assistants under their direction, and, in Quebec, Nova Scotia, and New Brunswick, there are superintendents of lights. The superintendent of lights for the district above Montreal is Mr. P. Harty, and his office is in the department.

REPORT OF THE SUPERINTENDENT OF LIGHTS ABOVE MONTREAL.

The steamer *Midland Queen* was employed for the trip of inspection of lighthouses and delivery of supplies for the season of 1907, for the district above Montreal. This district embraces lighthouses and fog alarm stations in the River St. Lawrence above Montreal, Lake Ontario, the mouth of the Niagara river, Lake Erie, Detroit river, Lake St. Clair, Lake Huron, Georgian bay, St. Mary's river, Lake Superior and Kaministiquia river, as well as the Upper Ottawa river as far as Des Joachim and the Lower Ottawa river to the junction of the St. Lawrence.

The work consisted in inspection of lighthouses and fog-alarm stations and the delivery of supplies to these stations. In some few instances it was possible to deliver the supplies direct from the steamer, but in the great majority of cases it was necessary to transfer the supplies from the steamer to small row boats and from these to the stations. It might be well to mention that almost all of the lights are inaccessible except by small boats. In fact the pier lights are about the only ones that can be reached by the steamer and some of these, on account of the shallow water, have to be served with the small boats.

Most of the light stations are provided with a boat, in some cases a flat boat, in others a skiff or a sail boat. Of these there are eighteen flat boats, one hundred and two skiffs, and fifty sail boats.

The oil delivered in 1907 comprised some 1,660 cases or 14,110 gallons, 180 barrels or 8,100 gallons making a total of 22,210 imperial gallons of Canadian oil. In addi-

8-9 EDWARD VII., A. 1909

tion to this there were some 124 cases or 1,240 wine gallons of American oil delivered to four stations with dioptric lights.

Lightkeepers on Lake Superior were instructed generally to put their lights in operation about April 26, and to keep them in operation until about December 10. It might be well to mention that the date of opening the lights was considerably later than that of previous years on account of ice conditions. The keepers on Lake Huron Georgian bay, Lake St. Clair, Lake Erie, Lake Ontario, and connecting waters were instructed to use their own discretion to some extent in putting their lights in operation, namely to open their lights as soon as navigation opened. Generally speaking they were instructed to keep their lights in operation until December 15. The lights in the St. Lawrence river were kept in operation as long as navigation remained open. Wherever a ferry service exists along the route the lights are kept in operation continuously during the year. This condition prevails at Gull island in Lake Ontario, Gore bay on Lake Huron, Cobourg and Ports Dover, Stanley and Burwell. At Gore bay the light is kept in operation during the winter months for the purpose of aiding travellers to cross on the ice from Spanish river to Gore bay.

During the year 1907, six of the keepers died and three were superannuated.

In general, the lighthouses were kept in excellent condition as regards cleanliness and general repairs. In only a very few cases was it necessary to reprimand the keepers for their conduct in this respect. Several improvements have been made in the lighthouse service bringing it up to a high standard of efficiency.

There are 237 light stations, 324 lights, 20 fog alarms, and 215 lightkeepers.

LIFE SAVING SERVICE.

The agent has reported upon the life saving service in Nova Scotia. Superintendent S. C. Campbell was sent to Westport, Brier island, to experiment with a gasoline motor fishing boat.

An agreement was entered into for a boat used in daily fishing in the Bay of Fundy, with Coxswain Thomas and a crew of four men and an engineer to be ready to go to any vessels or mariners in distress. Three schooners were helped off the rocks and one motor boat hopelessly broken down in the bay, restored safely to Westport. The question of employing fishermen in motor boats, received the attention of the department. The crews of fishing boats are the best boat handlers and shipwrecked crew savers obtainable in Canada. The boats are readily managed, more quickly got ready for action, more speedily organized and the most economical for life saving service now in sight. The agent of the Nova Scotia agency has reported that the method is simple, economical and successful.

At Charlottetown a new life-boat has been placed and life-boat house built, a station has also been established at Casumpeque. Three wagons were bought for transporting these life boats.

Life-boats were placed at Souris on the eastern coast of Prince Edward Island. A station was also established at Escuminac in New Brunswick.

A trail on the west coast of British Columbia in connection with life saving, has been begun and up to December 31, twenty-four miles had been completed, at a cost of \$33,358.82.

SESSIONAL PAPER No. 21

A life saving station was established at Ucluelet where a boat house and slip were built and the crew took charge on January 10. A motor boat has been built under contract and sent to Banfield, B.C., and the service begun on January 10. A life boat station has been established at Clo-oose, but owing to the difficulty of getting a crew the boat has not been in commission. A station has been established at Clayoquot, and the life boat was put in charge of a coxswain and crew on January 10 last. A list of the life-boat stations appears as Appendix No. 14 to this report.

DOCKYARD AND GROUNDS AT HALIFAX.

The appearance of the naval dockyard and grounds was improved during the season. The dockyard is now used for departmental purposes in storing lighthouse material, buoy anchors, chain and lighthouse repairs and equipment. Part of the building was assigned to the Admiralty Hydrographer, which he occupies as an office for himself and assistants. A place has also been assigned him for storing and repairing the gear and material of his vessel.

STEAMBOAT INSPECTION.

Canadian registered vessels inspected during the fiscal year numbered 1,690 ; gross tonnage 367,799. Vessels inspected but not registered in the Dominion numbered 154; gross tonnage 226,855 tons. The amount of fees collected for inspection was \$4,414.26.

The total expenditure in connection with inspection amounted to \$42,210.43, but part of this expenditure was for Dominion steamers and fog-alarms.

NAMES OF INSPECTORS.

Name.	Position.	Address.
Edward Adams	Chairman of Board of Steamboat Inspection..	Ottawa.
M. P. McElhinney	Inspector of Hulls and Equipment.....	Ottawa.
I. J. Olive	"	St. John, N. B.
Chas. W. Sealey	"	Halifax, N. S.
William Evans.....	"	Toronto, Ont.
M. R. Davis.....	"	Kingston, Ont.
Phillippe Duclos.....	"	Quebec, P. Q.
Stephen D. Andrews.....	"	Collingwood, Ont.
John Dodds.....	Inspector of Boilers and Machinery.	Toronto, Ont.
E. W. McKean.....	"	Collingwood, Ont.
J. B. Stewart.....	"	Toronto, Ont.
T. P. Thompson.....	"	Kingston, Ont.
Wm. Laurie.....	"	Montreal, P. Q.
L. Arpin.....	"	"
F. X. Hamelin.....	"	Sorel, P. Q.
J. Samson.....	"	Quebec, P. Q.
J. P. Esdaile.....	"	Halifax, N. S.
C. E. Dalton	"	St. John, N. B.
J. A. Thomson.....	"	Victoria, B. C.
G. P. Phillips.....	"	Kenora, Ont.
Frank M. Richardson.....	"	Vancouver, B. C.
C. T. Schmidt	Inspector of Dominion Steamers.	Halifax, N. S.

The report of the chairman of steamboat inspection forms Appendix No. 6 to this report.

CERTIFICATES TO MASTERS AND MATES.

During the twelve months ended March 31, 1908, 11 masters', 23 mates' and 29 second mates' seagoing certificates of competency; 202 masters' and 101 mates' coasting or inland certificates of competency; and 5 masters' coasting certificates of service were issued.

The total amount collected in fees from applicants for examination during the twelve months ended March 31, 1908, was \$4,306.05, and the amount expended on account of this service was \$11,508.31, an excess of expenditure over receipts of \$7,202.26.

The following statement shows the total receipts and expenditures on account of masters and mates since 1898 :—

	Expenditure.	Receipts.
	\$ cts.	\$ cts.
For the fiscal year ended June 30, 1899	3,568 26	4,486 50
" " " 1900	3,750 69	4,221 50
" " " 1901	3,720 25	4,808 24
" " " 1902	3,305 59	5,288 52
" " " 1903	4,968 36	5,790 50
" " " 1904	7,761 17	4,795 00
" " " 1905	5,884 74	4,643 85
" " " 1906	7,068 15	5,526 00
" " " March 31, 1907 (nine months)	5,934 16	2,294 50
" " " 1908	11,508 31	4,306 05
Expenditure	\$57,469 68	\$46,160 66
Receipts	46,160 66	
Excess of expenditure over receipts	\$ 11,309 02	

SHIPPING OP SEAMEN.

Under the provisions of chapter 113, an Act respecting Shipping in Canada, shipping masters are required to make returns twice a year. Most of the returns were sent to the department. The total number of seamen reported shipped was 18,013, and the number discharged was 11,542. The fees to shipping masters amounted to \$12,469. Many of the shipping masters of outlying ports reported that no seamen had been shipped or discharged during the year.

INVESTIGATIONS INTO WRECKS AND CASUALTIES.

The report of Commander O. G. V. Spain, Wreck Commissioner, forms Appendix No. 17 to this report. It will be seen on reference to it that twenty-one investigations into casualties were held. The investigation into the collision of the *Mongolian* and *Hurona* was held in Great Britain although all preparations were made for holding it in Canada. The accidents consisted of strandings, striking submerged rocks, one vessel striking a pier under water and twelve collisions with vessels.

SESSIONAL PAPER No. 21

The judgments of the court are given in full by the wreck commissioner in his report. Reference is made to various minor investigations into disobedience of orders in connection with traffic in the Lime Kiln Crossing in the Detroit river. The traffic in this channel is enormous, some twenty-five thousand vessels pass, carrying about seventy million tons of freight, in the course of a season. Regulations for the traffic have been adopted and a copy will be found in the report; a tug boat has been commissioned to patrol the Canadian waters day and night.

PORT WARDENS REPORTS.

In most cases the Port Wardens reported the number of vessels surveyed for damaged cargo and opening of hatches, but as several of them did not state the number of vessels surveyed, the amount of fees collected is only mentioned here. The fees reported by the Port Wardens amounted to \$8,357.

The report of the Port Warden at Montreal contains some important facts relating to the port of Montreal. Navigation was open later at the port than any other season of which there is a record. The steamship *Dunelm* from Middlesboro, England, with a cargo of pig iron, arrived on December 13.

No foreign going sailing vessels arrived during the year—a remarkable fact. The trading in sugar, molasses and lumber is now done by steamers.

There was an increase in the export of grain, flour and apples from Montreal, but a general decrease in other articles.

The quantities of grain and other articles reported by the Port Warden shipped from the port of Montreal during the season of 1907, was as follows: Wheat, 21,267,639 bushels; other grain, 11,163,950 bushels; flour and meal, 1,002,868 barrels; ashes, 430 barrels; apples, 593,317 barrels; cheese, 1,961,069 boxes; butter, 66,873 packages; eggs, 28,173 packages; meats, 274,074 boxes; lard, 436,283 packages; pulp, 3,814 tons; paper, 14,317 tons; sundries, 49,903 tons; hay, tons 7,255; oil cake, 17,950 tons; mineral, 14,937 tons; lumber, 111,819,895 feet board measure; cattle, 96,759 head; horses, 188; sheep, 11,384; dead meats, 1,855 quarters.

The reports of the Port Wardens are published in Supplement No. 1 to this report.

WRECKING PLANT.

The yearly subsidies were paid contractors when they became due. The amount of the subsidy being \$10,000 per annum, payments of \$5,000 are made semi-annually.

The contracts at present existing are with Messrs. George T. Davie & Son, Levis, P.O., the Dominion Coal Company, and the British Columbia Salvage Company. Messrs. Davie & Son keep the tug *Lord Strathcona* and plant in readiness to assist vessels that meet with accidents in the lower St. Lawrence river.

The following is a list of vessels that were assisted and in some cases salvaged by the plant of Messrs Davie & Son, during 1907.

Virginian, May 10. Accompanied the *Virginian*, Leyland Line, from Quebec to Montreal on account of having lost her anchors on the way up the river and afterwards proceeded with the steamer *Lord Strathcona* to the Traverse to pick up same.

8-9 EDWARD VII., A. 1909

Barge Ah, May 27. Towed the disabled *Barge Ah* from Escoumains to Quebec.

Danforth, August 21. Salvaging steamer *Danforth* ashore at Pentecost.

Bavarian, September 23. Towed and assisted *Bavarian* to her berth at Indian cove from where she broke away, and attending on her at other different times.

Mongolian, September 25.—Assisted damaged *Mongolian* from Quebec to Montreal.

Assiniboia, September 29. Towed the separated C.P.R. *Assiniboia* from Quebec to Montreal.

Keewatin, October 15. Towed the separated C.P.R. *Keewatin* from Quebec to Montreal and afterwards towing the different parts of both vessels through the canals to Port Dalhousie.

Chrs. Knudsen, December 4. Escorted the damaged *Chrs. Knudsen* through the ice from Quebec to Father Point and placing men and pumps on board of vessel to go to New York.

Frithjoe, December 5. Escorted the *Frithjoe* through the ice from Quebec to Father Point on her way to Sydney, N.S.

The Dominion steamer *Montcalm* ran on an uncharted rock near Point au Maurier, in November last, and the *Strathcona* was ordered to her assistance with wrecking plant. Salvage pumps were placed on board the *Montcalm* and the vessel afterwards proceeded to Quebec under her own steam.

The Dominion Coal Company maintains a wrecking plant at North Sydney during the months of open navigation in that harbour and at Louisburg during the winter months, always available for the waters of the Atlantic coast and Gulf of St. Lawrence. The following vessels were assisted by this company during the fiscal year of 1907-8:

Sokoto, March. Assistance was rendered this vessel ashore at Louisburg. Successfully floated.

Universe, April. Ashore at Canso. Successfully floated off and towed to Halifax.

Funreith, April. Ashore at White Head. Assistance rendered.

Bernicia, May. Ashore at Louisburg. Successfully floated off.

Felix, June. Ashore near Bras d'Or lake. Successfully floated off.

Oscar, June 11. Ashore on Flint island. Successfully floated off.

Balena, July. Ashore near Louisburg. Assistance rendered. Vessel in bad position, impossible to save her.

Jennie Myrtle, September. Ashore on Scatarie island although practically abandoned was successfully floated and taken to Sydney.

Fortuna, October. Ashore in Strait of Canso. Floated and successfully towed to Portland, Me.

Schooners *Beulah* and *Pearl*. Ashore in Sydney harbour. Successfully floated.

Schooner *M. J. Taylor*, although left in helpless condition was safely towed into port.

Schooner *Francis Renee*. Ashore in Sydney harbour. Successfully floated.

Coban. Ashore at Cranberry Head. Successfully floated.

The contract of the Dominion Coal Company provides that the *J. H. Thomas* shall be always ready for rendering assistance to wrecked vessels and where a larger

SESSIONAL PAPER No. 21

steamer may be required certain large steamers available shall go to the assistance of large ocean going steamers.

The Black Diamond steamship *Louisburg* went to the assistance of the Reford Line steamship *Kildona* which ran on a rock near Sable island in January last. The *Kildona* sank in 100 feet of water but the crew was taken off.

The British Columbia Salvage Company are the contractors for maintaining wrecking plant at Esquimalt to be always available in the waters of British Columbia. They own the steamers *Salvor*, *Wm. Jolliffe* and *Maude* and these vessels are equipped with modern salvage plant. During the fiscal year 1907-8, assistance was rendered the following vessels.

Northwestern. Ashore at Latouche island.

Santa Barbara.. Struck in Active Pass.

Otter. Went ashore on Dauger Reef.

Tartar. Collision in Gulf of Georgia.

Charmer. Collision in Gulf of Georgia.

Empress of China. Sunk in Vancouver harbour.

Cottage City. Broke her tail shaft at Bella Bella.

Indravelle. Went ashore at Kellee Bluff.

H.M.S. Shearwater ashore at entrance to Esquimalt harbour.

Vadso. Stranded near Caue Lago, was towed to Victoria.

SICK AND DISTRESSED MARINERS.

MARINE HOSPITALS.

Under the provision of the Canadian Shipping Act, chapter 113, part V, S. 384 R.S., dues of 2 cents per ton, registered tonnage, are levied on every vessel entering any port of the province of Quebec, Nova Scotia, New Brunswick, Prince Edward Island and British Columbia. The money thus collected forms the 'Sick Mariners' Fund.' Vessels of the burden of 100 tons and less, pay the duty once in each calendar year, and vessels of more than 100 tons registered tonnage, three times in each year.

The officers and seamen of all fishing vessels not registered in Canada do not pay sick mariners dues nor participate in the benefits accruing therefrom, but such vessels registered in Canada may pay dues and participate in the benefits; and if more than 100 tons, only for the voyage at the beginning of which payment has been made; but if payment has been made three times in each year, the sick mariners of fishing vessels shall enjoy the same rights and benefits as are enjoyed by vessels which pay dues but are not engaged in fishing.

The receipts for the fiscal year ended March 31 last, amounted to \$69,742.35 less \$377.90, refunds, making the net receipts \$69,364.45. The expenditure for the several provinces amounted to \$59,957.92.

The receipts of sick mariners' dues from each of the provinces are as follows :—Quebec, \$15,852.74; New Brunswick, \$12,054.21; Nova Scotia, \$25,568.68; British Columbia, \$18,863.48; Prince Edward Island, \$403.24.

The expenditure for each of the provinces is as follows:—

Nova Scotia.....	\$25,870 60
Prince Edward Island..	2,524 14
New Brunswick..	8,475 10
Quebec..	11,093 08
British Columbia..	9,723 47
	<hr/>
	\$57,686 39
Stationery, &c.....	2,271 53
	<hr/>
Total expenditure..	\$59,957 92

The ‘Sick Mariners’ Act’ does not apply to the province of Ontario, so no dues are collected from vessels in that province.

At the port of Quebec, sick mariners are cared for at the Jeffrey Hale and the Hotel Dieu Hospitals, at a per diem allowance of \$1.20 per seaman, including medical attendance and board.

At the port of Montreal, sick seamen are cared for at the General Hospital and at Notre Dame Hospital. The charge per diem for each seaman, including board and medical attendance, was \$1.20.

Marine hospitals are maintained in Louisburg, Yarmouth, Pictou, Sydney, Lunenburg and Point Tupper, in the province of Nova Scotia; and the sick seamen at Halifax, N.S., are cared for in the Victoria General Hospital for \$1.20 per diem per man, including board and medical attendance.

At Charlottetown, Prince Edward Island, sick seamen are cared for at the Charlottetown and the Prince Edward Island hospitals under arrangements made by the department with the managers of those institutions.

The Marine Hospital at Victoria, British Columbia, has a medical superintendent who receives \$300 per annum and a keeper whose salary is \$500 per annum. He is also allowed \$5 per week for the board and medical attendance of each sick mariner.

Where no hospital is maintained in the Maritime Provinces, Quebec and British Columbia, the Collectors of Customs are authorized to care for sick seamen when the vessels to which they belong have paid sick mariners’ dues.

Statement of receipts and expenditure on account of ‘Sick Mariners’ Fund’ from the fiscal year 1896 to 1908, both inclusive:—

	<i>Receipts.</i>	<i>Expenditure.</i>
Year, 1896.....	\$45,761 61	\$36,683 36
“ 1897..	54,358 10	35,931 19
“ 1898..	54,552 81	34,526 83
“ 1899..	57,365 79	35,353 29
“ 1900.....	59,971 84	32,743 30
“ 1901..	59,783 34	34,944 93
“ 1902..	65,853 83	51,827 12
“ 1903..	64,851 55	48,151 48
“ 1904..	61,778 29	50,801 78
“ 1905..	58,372 34	51,000 18
“ 1906..	60,133 90	50,120 42
“ 1907..	44,704 59	37,362 11
“ 1908.....	69,364 45	59,957 92

SESSIONAL PAPER No. 21

LIVE STOCK SHIPMENTS.

The inspectors of live stock shipments have reported regularly and a statement of sheep, cattle, horses, hay and grain shipped to the United Kingdom from the ports of Montreal and St. John, N.B., furnished.

The statement shows the steamboat lines by which the stock was shipped and the ports in Great Britain at which the vessels entered. It will be seen that the total number of cattle and horses shipped in 1907-8 was much below previous years taking shipments as far back as 1902-3.

The shipments from Montreal were as follows:—11,585 sheep, 96,977 cattle and 174 horses. The United States cattle shipped via Montreal numbered 20,100, but that number is included in the total of 96,977.

The shipments from St. John numbered 4,168 sheep, 20,210 cattle and 1 horse; of the cattle, 9,304 were United States cattle. The statement of live stock shipments forms Appendix No. 10 to this report.

PILOTAGE.

Under chapter 113, an Act respecting Shipping in Canada, part VI., a number of pilotage districts exist and pilotage authorities in these districts have been appointed by order of the Governor General in Council. The pilotage authorities have power to issue licenses to pilots, to make by-laws and regulations for governing pilots and vessels excepting ships belonging to His Majesty. All by-laws and regulations are subject to the approval of the Governor General in Council. The systems of pilotage differ according to locality. In some districts the payment of pilotage is compulsory whether pilots are engaged or not, in other districts, pilotage is optional.

The Act provides that the minister shall be the pilotage authority for the ports of Montreal and Quebec. Returns are annually made by all the pilotage authorities, showing the number of pilots licensed in each district and the amount of pilotage fees paid by vessels. These returns are published in Supplement No. 1, to this report.

The total pilotage collections for which returns have been received amounted to \$360,011.50 for the year 1907. Pilotage pension funds exist in several of the larger districts, for the benefit of aged pilots and in some cases for the benefit of widows and orphans of deceased pilots. These funds are controlled by the pilotage authorities, who retain a percentage of the earnings of the pilots for the purpose.

In some districts, pilots control their own expenditure for boats and means of conveyance to vessels. All expenditure for salaries of secretaries, office expenses, &c., is paid from the fees received for piloting vessels.

In some pilotage districts, the charge for pilotage is made at so much per foot draught and in others at so much per foot draught and an additional charge of so much per ton on the registered tonnage. For instance at Nanaimo, B.C., the rate is \$1 per foot draught and 1 cent per ton registered tonnage, and in Miramichi ports, \$2.25 per foot draught inwards and \$2 per foot outwards and 2 cents additional per registered ton for vessels wholly or partly propelled by steam.

8-9 EDWARD VII., A. 1909

MONTREAL RATES OF PILOTAGE.

The pilotage district of Montreal extends from the port of Quebec to Montreal. The rates of pilotage for the Montreal district are as follows :—

	\$	cts.
Quebec to Portneuf..... Vessels in tow or steamers per foot draught	0	50 upwards.
" " " " " "	0	50 downwards.
" " Sea-going steamers.	0	62½ upwards.
" " " "	0	62½ downwards.
" " Sailing vessels.....	1	05 upwards.
" " "	0	70 downwards.
" Three Rivers.... Vessels in tow or steamers per foot draught.....	1	50 upwards.
" " " " " "	1	50 downwards.
" " Sea-going steamers.....	1	75 upwards.
" " "	1	75 downwards.
" Sorel..... Vessels in tow or steamers per foot draught.....	1	50 upwards.
" " " " " "	1	50 downwards.
" " Sea-going steamers	1	87½ upwards.
" " "	1	87½ downwards.
" " Sailing vessels	3	15 upwards.
" " "	2	10 downwards.
" Montreal..... Vessels in tow or steamers per foot draught.....	2	00 upwards.
" " " " " "	2	00 downwards.
" " Sea-going steamers.....	2	50 upwards.
" " "	2	50 downwards.
" " Sailing vessels.....	4	20 upwards.
" " "	2	80 downwards.
Montreal to Sorel.....	1	00 upwards.
" "	1	00 downwards.

For the removal of any vessel from one wharf to another into or out of Lachine canal or from the foot of the current into the harbour or to Longueuil, \$5.

PILOTAGE RATES FOR THE HARBOUR OF QUEBEC AND BELOW THE HARBOUR.

From Father Point to Harbour of Quebec per foot draught of water; from May 1 to November 10, \$3.87; from November 10 to 19, \$4.95; from November 19 to March 1, \$6.02; from March 1 to May 1, \$4.41.

From Brandy Pots to Quebec, two-thirds of the amounts from Father Point.

From St. Roch Point to Quebec, one-third of the amounts from Father Point.

From Pointe-aux-pins or Crane Island to Quebec, one-quarter the amount from Father Point.

From Quebec to Father Point from May 1 to November 10, \$3.40; from November 10 to 19, \$4.46; from November 19 to March 1, \$5.54; from March 1 to May 1, \$3.93.

From any place in the harbour of Quebec not being a wharf, to any other place not being a wharf, \$5.

From any wharf in the harbour between Pointe-a-Carey below, and the west end of Allan's Wharf above, both inclusive, \$2.50.

SESSIONAL PAPER No. 21

PILOTAGE RATES AT HALIFAX.

			<i>In.</i>	<i>Out.</i>
Vessels of 120 tons and under.. . . .			Free.	Free.
" 120	"	200 tons.. . . .	\$9 60	\$6 00
" 200	"	300 tons.. . . .	13 20	8 40
" 300	"	400 tons.. . . .	16 80	10 80
" 400	"	500 tons.. . . .	19 20	12 00
" 500	"	600 tons.. . . .	21 60	13 20

Over 600 tons, an additional sixty cents for every 100 tons (or fractional part thereof) above 600 tons inward, and 30 cents outward. Outward pilotage for all vessels of 200 tons and upwards to be compulsory.

RATES FOR MOVING VESSELS.

Halifax Narbour, N.S.—

Under 1,000 tons.. . . .	\$3 00
From 1,000 to 2,000 tons....	5 00
" 2,000 to 3,000 tons.. . . .	7 50
" 3,000 to 4,000 tons.. . . .	10 00
Over 4,000 tons....	15 00

To Bedford Basin and Lawlor's Island—

Under 1,000 tons....	\$10 00
Over 1,000 tons....	20 00

RATES OF PILOTAGE FOR ALL SAILING VESSELS ENTERING AND LEAVING THE PORT OF ST. JOHN, N.B.

INWARD.

First District, from Partridge Island to Musquash Head, bearing N.W., per foot draft of water.....	\$1 50
Second District, from Musquash Head to Point Lepreaux. N.W., per foot draft of water....	1 75
Third District shall be from the outside limit of the Second District to a bound ranging from the North Head of Grand Manan to Liberty Point, bearing N.W. by W., North Channel, and from Machias Seal Island to Cape Sable, Seal Island, bearing S.S.E., South Channel, per foot draught of water....	2 25

OUTWARD.

From the harbour of the Port of St. John, N.B., to outside of Partridge Island, per foot draft of water.. . . .	1 25
Down the Bay of Fundy, when required, shall be two dollars per foot (\$2) draught of water, over and above the one dollar and twenty-five cents (\$1.25) harbour pilotage outwards.	

STEAMERS ENTERING AND LEAVING THE PORT OF ST. JOHN, N.B.

INWARD.

From Partridge Island to Musquash Head, bearing N.W., per foot draft of water....	\$2 00
From Musquash Head to Point Lepreaux, N.W., per foot draft of water.....	2 50
From Point Lepreux to Sable Island....	3 00

OUTWARD.

From the harbour of the port of St. John, N.B., to the out- side of Partridge Island, per foot draft of water..	1 75
Down the Bay of Fundy, when required, two dollars and seventy-five cent per foot draught of water (\$2.75) over and above the one dollar and seventy-five cents (\$1.75) harbour pilotage outwards.	
For all steamers not exceeding 120 tons....	\$2 00
Over 120 tons and not exceeding 200 tons....	2 50
Over 200 tons and not exceeding 300 tons..	3 75
Over 300 tons and not exceeding 400 tons..	5 00
and thirty cents additional for every 50 tons over 400 tons.	

RATES OF PILOTAGE AT PICTOU.

Vessels of 120 tons to 140 tons, \$6 inward and \$4 outward.

" 140	" 200	" 10	" 6	"
" 200	" 300	" 12	" 8	"
" 300	" 400	" 14	" 9	"
" 400	" 500	" 15	" 10	"
" 500	" 600	" 16	" 11	"
" 600	" 700	" 17	" 12	"
" 700	" 800	" 18	" 13	"
" 800	" 900	" 19	" 14	"
" 900	" 1,000	" 20	" 15	"

Vessels of 1,000 tons and upwards, 2½ cents per ton inward and 2 cents outward.

All vessels under 120 tons, \$4 inward and \$2 outward.

Docking and moving vessels from anchorage in harbour, \$4.

RATES OF PILOTAGE AT SYDNEY, C.B., N.S.

	To Sydney.	To North Sydney
For vessels under 120 tons..	Free	Free
From 120 to 150 tons..	\$ 7 00	\$ 6 00
" 150 " 200 "	8 00	7 00
" 200 " 250 "	9 00	8 00
" 250 " 300 "	10 00	9 00
" 300 " 350 "	11 00	10 00
" 350 " 400 "	12 00	11 00

SESSIONAL PAPER No. 21

and for every additional 50 tons or fractional part thereof, \$1; for vessels 800 tons and upwards, \$1, for every additional 100 tons or fractional part thereof. Outward pilotage shall be the same as inward.

RATES OF PILOTAGE AT LOUISBURG, C.B., N.S.

	Inward.	Outward.
On sailing vessels of 80 tons and under 150 tons..	\$5 00	\$3 00
On sailing vessels of 150 tons and under 250 tons....	8 00	5 00
On sailing vessels of 250 tons and under 400 tons....	9 00	7 00
On sailing vessels over 400 tons, 1 cent per ton additional, inward and outward.		
	Inward.	Outward.
On steamships of 80 tons to 500 tons..	\$ 8 00	\$5 00
“ 500 “ 1,000 “ ..	10 00	6 00
“ 1,000 “ 3,000 “ ...	12 00	8 00

NOTE.—Winter pilotage, from December 1 to April 15, shall be 50 per cent additional to the above rates on sailing ships and steamships.

RATES OF PILOTAGE FOR THE PORTS OF VANCOUVER AND HOWE SOUND.

For vessels under sail \$2 per foot draught of water and 1 cent per net registered ton.

For vessels in tow of a steamer, \$1 per foot draught of water and 1 cent per net registered ton.

For steamers, \$1 per foot draught of water, and 1 cent per net registered ton.

Any portion of a foot not exceeding six inches shall be paid as half a foot; any fraction exceeding six inches shall be paid for as one foot.

The pilotage from Cape Flattery or Royal Roads to a line drawn from Point Atkinson to the nun buoy on Spanish bank, or to the limits of Howe Sound as hereinbefore described, and vice versa, is not compulsory, but if the services of a pilot are required he shall be paid the following rates, viz.:—

	Per Foot
From Cape Flattery..	\$ 6 00
From Callum bay..	5 00
“ Beachy head..	4 00
“ Race rocks or Royal Roads..	3 00

For vessels under steam or in tow of a steamer the following rates shall be paid:—

	Per Foot.
From Cape Flattery..	\$3 00
“ Callum bay..	2 50
“ Beachy head..	2 00
“ Race rocks or Royal Roads, vessels under steam..	1 00
“ Race rocks or Royal Roads, vessels in tow of a steamer.	1 50

8-9 EDWARD VII., A. 1909

STATEMENT SHOWING THE PILOTAGE RATES FOR THE DISTRICT OF
VICTORIA AND ESQUIMALT, B.C.

(18) Vessels bound to other ports and coming to anchor in 'Royal Roads,' the pilotage shall be free, except the services of a pilot are employed, when pilotage according to the following graduated scale shall be payable:—

From inside, or north of 'Race Rock,' to Royal bay, or vice-versa, 50 per cent of the prescribed rates under clause (b) section 18. From Beechy head to 'Royal Roads' or vice versa, \$1 per foot.

From Pillar point to 'Royal Roads' or vice versa, \$3 per foot.

From Cape Flattery to 'Royal Roads,' or vice versa, \$6 per foot draught of water.

(b) For vessels entering into or clearing from the ports of Victoria and Esquimalt, the rates of pilotage shall be as follows:—

(1) For regular ocean steamers, 50 cents per foot draught of water and $\frac{1}{2}$ cent per net registered ton up to a maximum of 3,500 tons, on the inward voyage, and 50 per cent of the above on the outward voyage subject to a discount of 20 per cent.

(2) For irregular ocean steamers, \$1 per foot draught of water and $\frac{3}{4}$ cent per net registered ton.

(3) For regular steamers in the coasting trade between San Francisco and Lynn Canal inclusive, the rates shall be the same as for regular ocean steamers as rated in Clause 1.

(4) For vessels under sail, \$2 per foot draught of water and 1 cent per net registered ton.

(5) For sailing vessels in tow \$1.50 per foot draught of water and 1 cent per net registered ton.

(6) For all vessels entering into or clearing from Williams Head Quarantine Station, the rates shall be 50 per cent of the prescribed rates of any class of vessel for Victoria and Esquimalt, subject to exemption in section 17, clause 7; provided, however, that all coasters between San Francisco and Lynn canal inclusive, when compelled by special instructions from the Dominion Government to call at William's Head Quarantine Station, shall be exempt from pilotage dues unless the services of a pilot are requested.

(7) For all vessels of 500 tons and under, 75 cents per foot draught of water.

GULF PILOTAGE.

For all vessels from the limits of the ports of Victoria and Esquimalt to the limits of all ports on Puget sound and Gulf of Georgia, shall be \$1 per foot draught of water.

Steamers making regular trips to Victoria and Esquimalt and having paid the prescribed rates under clause (b) on the inward voyage and returning again to either of said harbours within a period of twenty days, shall only pay half the inward rates.

SESSIONAL PAPER No. 21

RATES OF PILOTAGE DUES FOR THE PILOTAGE DISTRICT OF PUGWASH, N.S.

					Inward.	Outward.
Vessels	80 and under	140 tons..	..	..	\$6 00	\$5 00
"	140	" 230 "	..	..	8 00	7 00
"	230	" 300 "	..	..	10 00	9 00
"	300	" 400 "	..	..	14 00	12 00
"	400	" 500 "	..	..	16 00	14 00
"	500	" 600 "	..	..	17 00	15 00
"	600	" 700 "	..	..	18 00	16 00
"	700	" 800 "	..	..	19 00	17 00
"	800	" 900 "	..	..	20 00	18 00
"	900	" 1,000 "	..	..	21 00	19 00

and all vessels over 1,000 tons shall pay 2½ cents per ton inward and 2 cents per ton outward, additional, on the register tonnage. All vessels under 80 tons accepting pilots shall pay 5 cents per ton inward and 4 cents per ton outward.

Vessels over 1,000 tons register after entering the harbour and being safely moored by a pilot, employing a pilot to be moved again to loading berth, dock or wharf from her first mooring, shall pay to the pilot so employed the sum of five dollars (\$5), and vessels under 1,000 tons register tonnage (except schooners of or under 300 tons) shall pay three dollars (\$3) for moving and mooring, to the pilot so employed. All steamers employing licensed pilots to be rated at net tonnage. Any vessel in charge of a pilot detained outside for the purpose of discharging ballast, to allow the pilot \$1.50 per day for such detention.

(11) All vessels requiring the services of a pilot in going through the drawbridges of Pugwash or Port Philip harbours, and going one and a half miles up either river beyond said drawbridges, shall pay in addition 2½ cents per ton each way.

(12) The pilot limits for the District of Pugwash to be bounded on the east by Cape Cliff and on the west or northwest by Lewis head, both in the county of Cumberland. Dated at Pugwash, November 20, 1903.

PILOTAGE RATES FOR THE CHARLOTTE COUNTY, N.B. PILOTAGE DISTRICT.

(1) From Seal island, Cross island, Little river, Southwest ledges of Grand Manan, Kent's island, Long Island bay, Moose river and Bailey's Mistake, to Saint Andrew's, Saint Stephen, or any harbour or loading place in the county of Charlotte. (except Campobello or the lines) pilotage inwards or outwards, \$2.25 per foot.

(2) From North head of Grand Manan, Beaver harbour and West Quoddy lighthouse to any port or harbour in the county of Charlotte (except Campobello or the lines) pilotage inwards or outwards, \$1.60 per foot.

(3) From Head Harbour lighthouse, Letite passage or Clam Cove head to any port or harbour in the County of Charlotte (except Campobello or the lines) pilotage inwards or outwards, \$1.50 per foot.

(4) From or to Campobello or the lines the pilotage inwards or outwards to be 20 cents per foot less than the above rates.

RATES OF PILOTAGE FOR THE PILOTAGE DISTRICT OF RICHMOND COUNTY, N.S.

All vessels belonging to the county of Richmond and all fishing vessels (when actually engaged in fishing) when such vessels do not exceed 250 tons, are exempted from pilotage dues.

PILOTAGE DUES (inwards).

For vessels of 120 tons to 150 tons.. . . .	\$ 6 50
“ 150 “ 200 “	7 50
“ 200 “ 250 “	9 00
“ 250 “ 300 “	10 00
“ 300 “ 350 “	11 00
“ 350 “ 400 “	12 00
and for every additional 50 tons or fraction thereof.. . . .	0 75

Outward pilotage is half above rates.

PILOTAGE RATES FOR SYDNEY AND NORTH SYDNEY.

The Pilotage rates for Sydney and North Sydney, N.S., are as follows:—For vessels under 120 tons registered in Canada are exempted from pilotage dues.

	Sydney.	North Sydney
For vessels from 120 to 150 tons.. . . .	\$ 7 00	\$ 6 00
“ 150 to 200 “	8 00	7 00
“ 200 to 250 “	9 00	8 00
“ 250 to 300 “	10 00	9 00
“ 300 to 350 “	11 00	10 00
“ 350 to 400 “	12 00	11 00

And for every additional 50 tons or fractional part thereof \$1. For vessels of 500 tons and upwards \$1, for every additional 100 tons or fractional parts thereof.

Outward pilotage shall be the same as inward.

Vessels hailed by a licensed pilot outside the harbour of Sydney, but within the pilotage district, and refusing to take the service of same shall be liable to pay half pilotage; and any vessel being offered the services of a pilot before leaving port and refusing the same shall be liable to pay half pilotage dues.

PILOTAGE DUES FOR THE DISTRICT OF PARRSBOROUGH, N.S.

	Per Foot, Draft
From Isle Haute to Spencer’s island.. . . .	\$1 25
“ “ Port Graville.. . . .	1 25
“ “ Diligent river.. . . .	1 50
“ “ West bay.. . . .	2 00
“ “ Partridge Island river.. . . .	2 50
“ “ Moose or Harrington river.. . . .	2 75
Spencer’s island to West bay.. . . .	1 25
“ “ Partridge Island river.. . . .	1 25
On all outward bound vessels.. . . .	1 50

SESSIONAL PAPER No. 21

By an Order in Council dated July 20, 1900, compulsory payment of pilotage dues was cancelled and the above rates are inserted here only to give a general idea of the rates now generally charged vessels wishing the services of pilots.

PILOTAGE RATES FOR THE PILOTAGE DISTRICT OF RESTIGOUCHE, N.B.

For every foot of water any ship shall draw at the time, inward or outward bound, Port of Dalhousie, Benjamin, Beaver point, Nash's creek, Jacquet river, or any loading station east of Dalhousie, on the Bay of Chaleur, \$1.50.

Port of Campbellton, Oak bay or any loading station east of same and west of Dalhousie, \$2 per foot when ship proceeds direct from sea.

Ships bound for Dalhousie, Benjamin, Beaver point, Nash's creek, Jacquet river or any loading station east of Dalhousie calling at any of said harbours for orders or to discharge ballast, cargo or otherwise, on ship's account, \$1.50, and thence to any other of the said ports or loading station on the Bay of Chaleur, 75 cents per foot on draught of such ship at the time.

Ships bound for Campbellton, Oak bay or any loading station east of Oak bay and west of Dalhousie, waiting at Dalhousie or any of the outer or bay ports to discharge ballast cargo or otherwise, on ship's account, \$1.50, and thence to the said port of Campbellton and Oak bay or any loading station east of Oak bay and west of Dalhousie, 75 cents per foot on draught of such ships at the time, and vice versa.

For the removal of any ships, including the properly securing and mooring such ship, the following rates:—

For ships not exceeding 120 tons.. . . .	\$1 50
“ “ over 120 “ to 200 tons.. . . .	2 00
“ “ 200 “ to 300 “	3 00
“ “ 300 “ to 600 “	4 00
“ “ 600 “	5 00

And when the distance of removal extends four miles, fifty per cent additional of the above rates. In addition to above rates, all vessels propelled wholly or in part by steam shall pay one cent inward and one cent outward per net registered ton.

REPORT OF THE HARBOUR COMMISSIONERS OF MONTREAL.

The following are the names of the Harbour Commissioners of Montreal:—G.W. Stephens, M.L.A., president; L. E. Geoffrion and C. C. Ballantyne, commissioners. Officers, David Seath, secretary; F.W. Cowie, M.Inst. C.E., chief engineer. John Kennedy, Inst., C.E., who had been chief engineer for a great many years retired from the position owing to injured eyesight.

The report of the Harbour Commissioners of Montreal for the year ending December 31, 1907, contains information respecting the operations of the commission.

The work on the permanent steel sheds under construction has been advanced rapidly during the year. At the beginning of the year, not any of the permanent sheds were available, but owing to the winter's work, the lower floors of five sheds

8-9 EDWARD VII., A. 1909

were completed by the opening of navigation and were made use of during the season. It is expected that by the opening of navigation 1908, three more floors will be ready for storing. The commissioners expect that the fourteen sheds will be completed by the opening of navigation in 1909.

The fourteen two-story permanent steel sheds on high level piers, will take the place of wooden sheds which were formerly taken down each fall and put up in the spring, by the companies owning them. The new sheds will provide more than double the accommodation existing formerly, for handling freight. The freight can be hoisted by the ship's tackle and stored in the second story.

A traffic department was organized with a view of relieving railway and vehicular traffic. This department handled successfully 70,000 cars; 20,000 of them were loaded and unloaded directly into the sheds or ships, which at an average of 20 tons to the car means 400,000 tons upon which about the sum of \$80,000 was saved in handling the freight. Owing to the success of the traffic department, the commissioners consider they were justified in purchasing three locomotives for permanent work.

Life saving apparatus was provided with the result that no drowning cases occurred from the wharfs in 1907. In former years cases often happened—as many as forty in the year 1906.

Fire Protection.—Fire protection was also provided by the purchase of a fire tug which has been in active service day and night; material assistance was rendered in putting out two fires.

Development problem.—Development problems have been studied and the distinguished engineer, Mr. R. C. H. Davison of London, England, whose specialty is the development of ports, was engaged in conjunction with Mr. John Kennedy and Mr. Cowie in making a report on different systems to be considered, for the greater efficiency of the port of Montreal for shipping.

Development of Eastern harbour.—The early development of the eastern part of the harbour has received serious study.

Successful buoying of ship channel.—The commissioners state that the ship channel of the St. Lawrence river has been so successfully buoyed and lighted that ocean liners have come up to Montreal during the night.

Grain elevator.—The grain elevator has not been used as much as was hoped, owing to the Grand Trunk Railway elevator handling most of the grain at Montreal, but a conveyor is being constructed which will do away with the necessity of moving vessels around the harbour to receive grain cargo.

Conveyor equipments.—The system of carriers now under construction in connection with ten of the new permanent freight sheds, which system is pronounced the most complete in the world, will in the near future be put in operation. On the opening of navigation in 1908, it is expected that grain may be conveyed directly to three steamships at their usual berths and all equipment will be completed early in 1909. When completed it will be possible to deliver grain to any four vessels at a time, without moving.

It is expected that in view of this unexcelled system of delivery, and of the quantities of grain which will come to Montreal, when the new harbours and railway con-

SESSIONAL PAPER No. 21

nections to Midland and Victoria harbour are completed that the elevator will have to be at least doubled in capacity by the erection of a new wing.

Work accomplished during year.—Part of the work accomplished during the year is as follows:

One and a half million tons of freight handled by Traffic Department.

Four hundred thousand tons of freight handled direct between car and shed and ship or vice versa.

Six acres permanent scoria paving laid, or twenty-eight thousand two hundred and thirty-four square yards.

Five and a half acres new concrete floor laid during winter.

Eighteen and a half acres new concrete floor laid since May 1, 1907.

Two and a half acres reinforced concrete roof laid since May 1, 1907.

One thousand six hundred tons of steel erected since May 1, 1907.

Three thousand five hundred tons of steel manufactured since May 1, 1907.

One thousand tons of steel delivered since May 1, 1907.

Three thousand seven hundred and eighty-six Raymond concrete piles driven since May 1, 1907. (Designed to carry shed loads of one hundred and fifty thousand tons).

Six thousand five hundred cubic yards of concrete foundation laid since May 1, 1907.

The whole of Jacques Cartier pier raised to high level.

Three miles of new railway track laid and ballasted.

Twenty-one and three-fourths miles old railway track repaired.

Six hundred feet new permanent concrete wharf erected, in addition to harbour dredging, blasting and filling.

Shipping using Port during 1907.

Seven hundred and forty-three sea-going vessels with a tonnage of.....	1,923,658 tons.
Fourteen thousand four hundred and twenty inland vessels with a tonnage of..	3,620,750 “
Total tonnage.....	5,544,608 “

Capacity Present Harbour and Ship Channel.

Steamships drawing twenty-nine feet can use channel to Montreal.

Navigation opened April 27, 1907.

Navigation closed December 13, 1907—seven months and twenty days.

Least depth in channel, 30 feet, 10 inches.

Wharf Accommodation.

The extent of the wharfs at the end of 1907, is as follows :—

For 30 feet draught and over..	16,354 lin. feet or 3.097 miles.
For 25 feet to 27½ feet draught..	19,444 “ 3.682 “
Total deep draught..	35,798 “ 6.779 “
For 20 feet and under..	3,137 “ 0.594 “
Total wharfage end of 1907..	38,935 “ 7.373 “

8-9 EDWARD VII., A. 1909

Summarized Statement of the Operations of the Harbour Commissioners of Montreal.

The harbour revenue was \$404,274.56, an increase of \$23,088.24 over that of the previous year. The increases were: wharfages on imports, \$15,116.44; local wharfages, \$6,107.47; rentals, &c., \$2,570.03; in all \$23,793.94, while the wharfages on exports decreased \$705.70, leaving the net increase as above.

The revenue from the grain elevator was \$7,970.63, an increase over that of the previous year of \$1,084.87.

The lower floors of five of the permanent wharf sheds were rented for \$14,600.

A traffic department was organized in May last, and there was received for switching cars on the wharfs \$71,815.93.

The revenue from all sources as enumerated above, was \$498,661.12, and the disbursements on that account were \$497,837.86.

The interest on loans was \$336,277.86, of which \$259,167.24 was for harbour improvements; \$55,401.20 on account of the new steel sheds, and \$21,709.42 for the grain elevator.

The amount disbursed on capital account was \$1,745,709.91, of which \$40,273.60 was on account of the grain elevator conveyor system; \$48,098.43 for harbour railway tracks; \$1,277,476.16 on account of the new steel sheds and the balance of \$379,861.72 on account of harbour improvements.

The following loans were received from the government, \$25,000 under the Act 1, Edward VII., chap. 9; \$1,010,000 under the Act 3, Edward VII., chap. 36; \$500,000 under the Act 6-7, Edward VII., chap. 30, making a total of \$1,535,000.

The bonded debt at December 31, 1907, was \$10,347,000 of which \$1,972,000 is due to the public, and \$8,375,000 due to the government, and upon which the average rate of interest is 3.35 per cent.

Number of Vessels and their Tonnage arriving at the Port of Montreal, 1907.

The number of sea-going vessels which arrived in port during the season of 1907 was 742; tonnage, 1,925,986, a decrease of 78 vessels and 47,237 tons from the previous year.

Of inland vessels, 14,420 arrived with a tonnage of 3,620,950, an increase of 1,863 vessels, and an increase of tonnage of 524,784 making a total of vessels of all classes of 15,161 and a total tonnage of 5,546,936, an increase of 1,784 vessels and 478,539 tons over the previous year.

Information of Improvement and Maintenance.

Interesting information is given in the report of the harbour commissioners respecting the stability of the elevator building, marine tower dock and dredging in the harbour to increase the width of the 30 foot channel, construction of the railway embankment along the harbour from Molson's creek, construction of a permanent new wharf, raising other piers to the high level, repairing wharfs and filling in the foundation of the steel freight sheds. Buoys and beacons were also placed in the harbour.

The electric lighting of the harbour was increased by a number of lamps and changes made in other lamps, the greatest number of lamps burning at any one time being 171.

SESSIONAL PAPER No. 21

REPORT OF THE HARBOUR COMMISSIONERS OF TORONTO, ONTARIO.

The names of the Harbour Commissioners of Toronto are as follows :—T. S. Spence, chairman; J. T. Mathews, vice-chairmen, W. H. Pearson, T. L. Church, Ald. and P. B. Whytock; the harbour master is Colin Wm. Postlethwaite.

The harbour of Toronto is in extent about two miles east and west and one and a quarter miles north and south containing about two and a half square miles.

The harbour is perfectly land-locked; a formation of sand called the island extends the whole length of the southerly limit and east to the limit of Ashbridges bay adjoining the harbour.

There are two entrances to the harbour; the western entrance called the Queens Wharf channel; the east one which has been dredged and faced with piers being the chief entrance. Both entrances are provided with lights and carefully buoyed. A fog bell is established in the western channel and a steam fog-horn of modern pattern at the eastern entrance.

The average depth of water in the harbour is 20 feet and at the freight wharfs at all times 14 feet; a sufficient depth to accommodate any vessels which pass through the St. Lawrence or Welland canals.

There are no arrangements at Toronto for interchange of package freight, but it must be conveyed from docks to railway depots or from the depots to the docks.

There are twelve railway sidings to coal docks; twelve to lumber wharfs and one to the Richelieu and Ontario Navigation Companys' wharf for delivering fruit to the express companies.

The harbour was clear of ice on March 28, 1907; the first vessel arrived on April 1, and the last arrival was on December 15. The number of vessels arriving during the year loaded, was 3,651 and 10 unloaded; of this number 3,150 were propelled by steam and 481 were sailing vessels, the total tonnage was 1,640,354.

The following is the quantity of freight in tons received by water at the port ; general merchandise 59,945; coal 155,915; lake stone, 4,530; fruit in barrels, 4,545, in crates, 45,530; in baskets, 202,581, and in bags, 271; ice, 5,823 tons; bricks, 30,000; grain, 8,200 bushels; horses, carriages and cattle 188, and oil in bulk 68,317 barrels.

The commissioners continued the work of dredging under contract in the western channel and at several wharfs in the harbour. In all, 14,255 cubic yards of material were removed at a cost of \$3,659.95.

The Public Works Department of the Dominion government carried on dredging operations in the eastern channel and approaches, making the channel at the approaches 20 feet in depth and 19 feet in depth between the piers. The approach to the channel at the outer part is 1,000 feet, narrowing to 400 feet between the piers.

The receipts for the year amounted to \$11,904.66 and the expenditure to \$8,415.75. The cash in bank and on hand at the end of the year amounted to \$9,286.17.

THE REPORT OF THE QUEBEC HARBOUR COMMISSIONERS.

The following comprise the Quebec Harbour Commissioners:—J. B. Laliberté, chairman; Dosithée Arcand, W. M. MacPherson, E. Dussault, Geo. Tanguay, M.P.P., W. N. Dobell, R. Larue and J. S. Thorn, commissioners. Officers, James Wood, secretary; St. Geo. Boswell, C.E., chief engineer.

The report of the commissioners for the calendar year 1907 was received, and will be printed in Supplement No. 1, to this report.

In order to show the extent of the harbour and the facilities for shipping, a short description of the Wet dock, Tidal harbour, Cross Wall and Breakwater is here given.

Wet dock.—The Wet dock is an inclosed basin of 40 acres water surface. Entrance 66 feet wide, depth of water, 28 feet over sill at high tide, general depth 25 feet.

Quay Frontage of the Wet Dock.

Louise Embankment Quay wall.. . . .	Frontage, 2,085 lin. feet.
	Min. depth of water, 25 feet.
Dominion Coal Co's berth.. . . .	Frontage, 400 lin. feet.
	Min. depth of water, 25 feet.
Cross wall north of entrance.. . . .	Frontage, 600 lin. feet.
	Min. depth of water, 25 feet.
Cross wall south of entrance.. . . .	Frontage, 230 lin. feet.
	Min. depth of water, 18 feet.

Tidal Harbour.

The Tidal harbour is a basin with a water surface of 20 acres; general depth of water 26 feet at low tide; the entrance to the basin is 200 feet wide.

Quay Frontage of Tidal Harbour.

Louise Embankment Quay wall (under construction).. . . .	Frontage, 1,070 lin. feet.
	Depth of water at low tide, 28 feet.
Cross wall, north of entrance.. . . .	Frontage, 600 lin. feet.
	Depth of water at low tide, 26 feet.
Cross wall, south of entrance.. . . .	Frontage, 150 lin. feet.
	Depth of water at low tide, 24 feet.
Point-à-Carcy.. . . .	Frontage, 600 lin. feet.
	Depth of water at low tide, 29 feet.
Breakwater, Tidal harbour face.. . . .	Frontage, 680 lin. feet.
	Depth of water at low tide, 24 feet.

FRONT RIVER

Surface of Quays about 50 acres.

Point-à-Carcy, Pond face.. . . .	Frontage, 280 lin. feet.
	Depth of water at low tide, over 40 feet.
River face.. . . .	Frontage, 580 lin. feet.
	Depth of water at low tide, over 40 feet.
Breakwater.. . . .	Frontage, 880 lin. feet.
	Depth of water at low tide, over 40 feet.
Breakwater extension completed.. . . .	Frontage, 850 lin. feet.
	Depth of water at low tide, over 40 feet.
Under construction.. . . .	Frontage, 610 lin. feet.
	Depth of water at low tide, over 40 feet.

There are eleven (11) landing sheds with a floor area of 186,350 sup. feet.

In connection with freight sheds, goods are trucked by hand to and from ships' gangways, and from there handled by ships winches; the only mechanical appliances for handling freight are the coal discharging plants of the Dominion and Nova Scotia Coal Companies, and the grain loading galleries and marine tower, connected to the harbours commissioners' elevator, capacity, 250,000 bushels, and the Canadian Northern elevator capacity, 1,000,000 bushels.

All railway lines run on docks owned by the harbour commissioners. Freight sheds have railway sidings on shore side and in some cases on dock front; open berths have sidings along dock front.

SESSIONAL PAPER No. 21

Cold store has a refrigerated space of 100,000 cub. feet, and in connection with the cold store there is a general warehouse of four flats 130 x 35 feet.

The cross wall divides the wet dock from the tidal harbour, forms part of the quay frontage in both of the basins, and connects the Louise embankment with the city.

During the year the new cribwork to the quay front, Louise embankment, in the wet dock, was completed. In the tidal harbour five substructure cribwork blocks were sunk in position along the embankment quay front, making a finished length of foundation in the tidal harbour of 810 feet.

The cross wall was strengthened by tie rods.

A railway line running parallel to the main line has been partly completed, and when finished will connect with the sidings serving the various freight sheds and berths of vessels in the tidal harbour and wet dock.

Partial repairs have been made to the tidal harbour face of the breakwater and to the northern cribwork.

The range light at the northeast corner of the breakwater has been placed on the new metallic tower, and the railway tracks along the river front of the breakwater completed.

A receiving shed has been erected in connection with the cold store.

At the instance of the commissioners, the Dominion Government added 200 feet to their breakwater extension shed. The addition will allow three of the largest steamers to berth at the breakwater and extension shed at the same time, and will greatly facilitate the trade of the port. The commissioners acting as agents of the Public Works Department have the management of the breakwater and extension.

The cross wall drawbridge was operated for the first time the past season on April 15, and for the last time on December 6.

The water was retained in the wet dock for the first time on April 27, and for the last time on December 5, on which date the gates were allowed to remain open, and were secured for the winter.

The grain elevator and a brick building were purchased from the Quebec Terminal Company by the commissioners.

The expenditure of capital account during the year has been \$145,766.93.

Particulars of this expenditure will be found in a statement printed in Supplement No. 1 of this report.

The commissioners received advances from the Dominion Government during 1907 in connection with the work of deepening and strengthening the dock walls, of \$117,080.75.

The revenue of the commissioners for the year 1907 was \$108,623.19, an increase of \$5,723.57 over that of 1906, and the expenditure, \$87,369.33, leaving a surplus of \$19,253.81 over the working expenses and interest on \$350,000.

The vessels which landed cargo on the wharf numbered 235 with a registered tonnage of 1,119,239, and the vessels which loaded from the wharf were 67, tonnage 249,030 register.

8-9 EDWARD VII., A. 1909.

REPORT OF THE THREE RIVERS, P.Q., HARBOUR COMMISSIONERS.

The following commissioners comprise the Harbour Board of Three Rivers, viz.:— F. A. Drolet, chairman ; Jos. L. Fortin, Edmond Dufresne, P. A. Gouin, F. S. Tourigny and Gec. Balcer, secretary.

The present wharf accommodation extends from the western bank of the St. Maurice river up to the icebreaker, a distance of about 5,500 feet. Within this distance there are several wharfs; the St. Maurice Lumber Company's wharf used for local and inland waters traffic and one berth for an ocean going steamer; the harbour commissioners wharf with accommodation of 1,350 feet, the depth of water at the front of the wharf being from 30 to 35 feet and reserved exclusively for ocean going vessels. The commissioners have another wharf 420 feet in length with 25 feet depth of water for vessels of inland waters, and another wharf 300 feet, with a depth of 25 feet of water, that is used by passenger and freight lines.

The Richelieu and Ontario Navigation Company's wharf is between the last two mentioned wharfs and is used by the steamers of the company.

A private wharf intervenes between the 300 feet wharf of the commissioners and the new government dock. This new dock is 2,000 feet long and built of concrete with a minimum depth of 30 feet of water along the front extension and intended for ocean traffic exclusively.

The top surface of the commissioners wharfs varies from 200 to 275 in width and the government wharf from 200 to 300 feet, the area being over 500,000 square feet for the government dock alone.

Other wharfs are the old Grand Trunk wharf, the wharf at Cap la Magdeleine which accommodate large freight and passenger traffic.

A railway line runs along the whole water front and branches connect the port with manufacturing centres.

The port of Three Rivers is also directly connected with the most important trunk lines of the country, and facilities for loading and unloading freight from cars to the vessels and from vessels to the cars, have been provided. In the southern part of the harbour, however, there are no railway sidings.

The port is very favourably situated for shipping having a channel from 30 to 50 feet in depth along the wharfs very little current and a roadstead from 1,200 to 1,500 feet in width.

The commissioners have reported that there has been a great falling off in the ocean traffic of Three Rivers. This was due to the low prices prevailing in the lumber market of Great Britain, and to the fact that high water prevailed in the river enabling ocean going vessels to take full cargo at Montreal. Eight steamers, carrying two and a half million feet of lumber, sailed direct for Great Britain and one steamer for Cuba, carrying one hundred thousand feet. About ten million feet of lumber was sent to Montreal or Quebec for transshipment.

While ocean traffic diminished, the trade with the United States increased. This trade was carried on by canal boats and steam barges. The exports have nearly doubled within the last two years, amounting in 1907 to \$2,340,000. The quantity of lumber exceeded twenty-five million feet valued at \$450,000, pulpwood, eighty-eight thousand cords; wood pulp, \$200,000; paper, \$200,000; asbestos, \$213,000; aluminum, \$167,000.

SESSIONAL PAPER No. 21

Number of vessels inward, 30, with a tonnage of 56,120 and the same vessels outward, steam barges and canal boats to the United States, 990, tonnage, 117,979. Inland traffic tugs, steamboats and barges, 364, tonnage, 42,242, making a total of 1,384 vessels, barges and canal boats with a tonnage of 216,261 exclusive of passenger and market boats.

The receipts from wharfage rent of wharf, tonnage dues, harbour dues inwards and outwards, amounted to \$16,912.97. Proceeds from depentures and material sold \$3,046.92. Balance of cash on hand and deposit in bank of \$8,413.13, making a total of \$28,373.02. The disbursements on revenue account, including sinking fund and interest on debentures, amounted to \$16,740.12; on capital account, \$1,417.65; deposit in bank, \$9,099.61, and claim on debentures, \$1,115.64, making a total of \$28,373.02.

HALIFAX HARBOUR.

The Harbour Master at Halifax has furnished a report giving particulars of the area of the harbour and its facilities for loading and unloading vessels, wharf accommodation, &c.

Halifax harbour from Georges island to the Narrows is about 3 miles long by three-quarters of a mile wide; the depth of water at low tide is from 10 to 14 fathoms with good anchorage ground.

There are 17 wharfs capable of accommodating coasting and freighting vessels with an area of 125,559 square feet, upon which a number of sheds are built.

There are also 22 wharfs capable of accommodating steamers from 1,600 tons upwards with an area of 330,335 square feet and shed area of 104,981 square feet; the depth of water measuring from 29 to 46 feet. At these wharfs, vessels can load into the sheds and one cold store which will contain 1,000 tons.

In addition to the wharfs above mentioned, the Halifax Tramway Company and the Dominion Coal Company own quays which together hold about 7,000 tons of coal.

The King's wharfs, two in number, used by the military, have a frontage of 250 feet, with depth of water of 20 feet. The dockyard is about 2,700 lineal feet, and water of a depth of from 12½ to 36 feet.

The graving dock, 600 feet long, has a frontage of 825 feet, with three wharfs used as quays and three sheds with an area of 21,552 feet. The depth of water at these quays is from 36 to 51 feet. All the above measurements are at low tide.

The Intercolonial Railway wharf has tracks laid upon it together with a coal chute and grain carrier, and vessels can be discharged into cars and stores alongside.

THE REPORT OF THE HARBOUR COMMISSIONERS OF NORTH SYDNEY.

The names of the commissioners are:—A. J. McDonald, M. W. Lawlor, and Wm. Hackett.

During the year the number of vessels visiting the port was as follows:—755 ocean steamers, registered tonnage, 1,111,249; coastwise steamers, 214; registered tonnage, 61,447; barks, 6; tonnage, 4,194; barkentines, 10; tonnage, 1,875; brigantines, 1,470; schooners, 742; tonnage, 36,950.

The coal shipments amounted to 1,752,511 tons and the iron ore received to 126,820 tons.

8-9 EDWARD VII., A. 1909

North Sydney is a safe harbour, easy of access for vessels of all classes, with good anchorage anywhere inside the heads. The water area of the harbour is about twelve square miles, with a depth for anchorage of 46 feet at high water and 42 feet at low water.

The port is the terminus of the Intercolonial Railway and has the following wharf accommodation:—The pier used by the railroad has sheds for good accommodation; depth of water alongside of pier, 24 feet running 200 feet at high water and 20 at low, the depth at the inner end of the pier varies from 24 feet to 10.

The Nova Scotia Coal and Steel Company owns two cargo piers, one 900 feet long with a depth of 28 feet of water at high tide. Storage pockets for coal of 5,000 tons, the top of the pier is 70 feet and the discharging end of the chutes 45 feet above high water. The second pier is 650 feet in length and on it are fitted up two gentry cranes with lifting power of ten tons each. The dock between the two piers has been dredged to a depth of 28 feet, and at the end of the dock is a low level wharf 250 feet in length, available for landing and storing goods.

There is also a breakwater in the harbour east of the piers 1,500 feet in length with a depth of water of 16 feet for 300 feet of its length at low water.

There are three other good wharfs about four hundred feet in length, with a depth of 20 feet at high, and 16 feet at low water. They have large warehouse accommodation.

There is a small marine railway capable of hauling out vessels of 250 tons register.

There is a rise and fall of four feet ordinary spring tides.

REPORT OF THE HARBOUR COMMISSIONERS OF BELLEVILLE, ONT.

The names of the commissioners are: David Price, chairman; the mayor for the time being, and T. S. Carman.

Navigation opened in Belleville harbour on April 11 and closed December 2, for the year 1907.

The imports by water stated in the report were as follow:—640,750 feet of lumber; 451,000 laths; 18,370 tons of coal; 1,512 tons of merchandise, and 297 tons of clay. The exports were 962½ tons of merchandise; 1,019 tons of cheese; 2,052 bushels of grain; 24,699 logs and cedars; 95,000 feet of lumber, 29½ tons of iron, and 100,000 shingles. The total amount of dues collected was \$2,385.93.

THE HARBOUR OF ST. JOHN, N.B.

The harbour of St. John, N.B., is under the control of the city corporation, and the latest information respecting the harbour has been obtained through the agent of this department from the city and owners of wharf property.

The tide rises and falls in the harbour of St. John from 20 feet at ordinary neap tides to 28 feet at spring tides. The rise and fall of the tides keep the harbour free from ice all the year. The port is the terminus of several steamship lines in winter. Partridge island protects the harbour on the south side, and from Partridge island to the head of the harbour is a distance of two and one-half miles. There are two channels, known as the east and west, on each side of the island. The east channel is 800 feet wide, varying in depth from 22 feet to 30 feet at low water, spring tides, and is

SESSIONAL PAPER No. 21

used by all vessels drawing more than nine feet of water. The channel is being deepened and will shortly be navigable at any stage of the tide for the largest steamers.

About one mile inside Partridge island, a beacon marks the western boundary of the main channel, and from the beacon looking north to the head of the harbour it is one and a half miles long and from 1,400 to 2,900 feet wide, and this harbour is fully developed.

There are at present in use 15 deep-water berths for ocean steamers, with capacious warehouses, seven berths for steamers drawing not more than 10 feet of water, and one mile and a half of frontage, including slip-faces at which vessels can be moored and receive cargoes although grounded, without inconvenience or damage. The facilities for repairing consist of sets of blocks owned by the city and private concerns.

The anchorage grounds in and adjacent to the harbour extend over a wide area. For large vessels there is ample anchorage accommodation, and the bottom is composed of soft mud with gravel in places.

There are 38 wharfs, ranging in length from 200 to 1,540 feet. There are 15 large sheds besides coal sheds and pockets. There are about 18 railway sidings belonging to the Pacific Railway Company, the Intercolonial railway and the New Brunswick Southern railway adjacent to the wharf sheds. At 19 wharfs the depth of water ranges from 18 to 31 feet at low water. At 18 wharfs it is 20 feet at high tide.

A cold storage plant is owned by the New Brunswick Cold Storage Company and is located beside and facing the Intercolonial pier. Any large or small vessel running into the port may easily dock there at any time. There is siding accommodation for sixteen cars at one time, operated either by the Intercolonial or Canadian Pacific railways, when required. The cold store, in addition to large space for general storage, has accommodation of 80,000 cubic feet for fresh fish.

VANCOUVER HARBOUR.

The Harbour Master of Vancouver has furnished a description of the wharf accommodation at Vancouver. The Canadian Pacific Railway wharfs have an area as follows: Main wharf, 2,800 lineal feet berthing accommodation and 270,100 square feet area. For a distance of 1,160 feet the depth of water is 27 feet at low tide and 43 feet at high tide; for a distance of 1,640 feet the depth of water is 23 feet at low tide and 39 feet at high tide. The company owns five freight sheds, with an area of, 136,510 square feet.

They have also a transfer slip, at present handling two barges per day of twelve cars capacity each; the business can be increased by employing more barges.

The means of loading and unloading employed, are generally by ships tackle and trucking, and one steamer crane five tons capacity. One derrick of 30 tons capacity for loading direct from the cars to ships is under construction. Railway tracks are adjacent to all sheds.

A new wharf is under construction which will add 1,500 lineal feet of berthing, 126,000 square feet of area and sheds of 33,000 square feet. The depth of water alongside the wharf is 30 feet at low tide and 40 feet at high tide.

8-9 EDWARD VII., A. 1909

The Evans Coleman wharf has a surface area of 169,540 square feet; depth of water at high tide from 36 to 57 feet, at low tide from 20 to 41 feet; the number of sheds on the wharf is 13 and the area of floors is 128,315. A railroad siding runs to the end of the westerly arm of the wharf and cargo can be loaded into and out of steamers direct.

The Vancouver Ice and Cold Storage Company have two public cold storage buildings; one for butter, cheese and eggs, and the other for freezing and storage of fresh fish. These buildings are on the water front and have a railway siding. The present storage capacity is 350,000 cubic feet and the ice making capacity 50 tons per day.

The MacDonald Marpole Company, Limited, own bunkers; capacity about 600 tons, and two coal sheds of 2,000 tons capacity.

The 'Union S. S. Company, lease a wharf from the Canadian Pacific Railway Company, which has a surface area of 59,500 square feet, depth of water alongside is from 36 to 12½ feet at low tide. On the wharf are four sheds, area of floors 24,450. There is a railway siding to one shed.

Messrs. Brown and Howey have a large warehouse for feed, hay and grain, and the outer end on the wharf is occupied by the New England Fish Company, operating four steamers in the halibut fishery.

In False creek there are about 15 small wharfs and one wharf in the east end of the city owned by the Sugar Refiners Company.

The harbour of Vancouver is very capacious and well sheltered in parts from storms.

VICTORIA HARBOUR.

The wharfs in Victoria are divided into three groups; the outer wharfs, sometimes called the ocean docks, are used by ocean going steamers. They are situated on the east side of the entrance of the inner harbour and consist of two wharfs, the old and the new wharf. The old wharf is 754 feet long on one side and 590 feet on the other; it is 100 feet wide except at the outer end, where it is 140 feet wide. The freight shed upon this wharf is 524 feet long by 60 feet wide, giving a floor space of 31,440 feet.

At the new wharf, ships use the north side and end only, the berthing space at the side is 940 feet and 140 feet at the end. The freight shed is 770 feet long, giving 47,900 superficial feet of shed room. The general depth of water at these wharfs at low tide is 33 feet excepting at one spot where the water is 26 feet only.

The wharfs of the inner harbour have a frontage of 4,136 feet and shed area of about 84,000 superficial feet. These wharfs lie along the city front and the depth of water at low tide ranges from 12 to 18 feet.

Around the inner harbour there are 11 wharfs owned by industrial concerns. These have a frontage of some 15,000 feet, depth of water from 6 to 12 feet at low tide. Sheds on these wharfs have a floor space of about 20,000 feet.

There are no railway connections at Victoria wharfs. The city has one cold storage plant and shed of 30,000 cubic feet capacity.

Steamers use their own winches for loading and unloading, but freight in coasting

SESSIONAL PAPER No. 21

steamers is handled by small trucks. Sailing vessels are loaded by means of movable hoisting engines.

The anchorage ground for large vessels is the Royal Roads outside the harbour, in summer, and at Esquimalt in winter, where from five to eight fathoms of water with mud bottom may be had.

LEGISLATION.

Section 4 of the Canada Shipping Act, Chapter 113 of the Revised Statutes, was repealed.

The Governor in Council may now make regulations in respect of the manner in which ships belonging to His Majesty may be registered as British ships.

Section 27 of the said Act was amended, relating to the names of ships.

Paragraph (f) of section 72 describing the meaning of a coasting voyage, the said Act is amended by inserting section 75A after section 75 relating to the examination of masters and mates.

Section 96 was amended by striking out the words 'one hundred,' and substituting 'one hundred and fifty,' relating to a ship on a coasting voyage carrying a certificated master.

Section 97 of the said Act is amended by striking out the words 'two hundred' and inserting 'four hundred,' relating to certificated mates in certain cases.

Section 100 of the said Act is amended by inserting after the word 'hire' the words 'or to steamers of not more than five tons, gross tonnage,' relating to certificated officers.

Section 120 of the said Act is amended, relating to going to sea without a certificate.

Subsections 1 and 2 of section 141 are repealed, relating to fees in engagement or discharge of seamen.

Section 384 of the said Act was amended by striking out the word 'two' and inserting the words 'one' and 'one-half,' relating to tonnage duty.

Sub-paragraph (v) of paragraph (c) of subsection 1 of section 477 is amended, relating to pilotage dues and exempted ships.

Section 714 of the said Act is repealed and a new section 714 substituted, as to deck loads in winter, the carrying of heavy wood goods, light wood goods, exemption from fines in certain events, and the interpretation of both heavy wood goods and light wood goods, and the space in which wood goods are carried.

Subsection 2 of section 724 of the said Act is amended by striking out the word 'twelfth' and substituting the word 'sixteenth,' relating to deck loads.

Chapter 46 of the Statutes of 1906 is repealed, relating to deck loads.

Section 732 of the said Canada Shipping Act is amended by adding the words 'certificates,' 'includes license and branch license,' relating to wrecks, &c.

Section 781 is repealed and a new section 781 substituted, relating to the commissioner for formal investigations and the court.

Section 782 of the said Act is repealed and a new section 782 substituted, relating to the duty of the court of investigation; the said Act was also amended by inserting after section 782 a new section 782A, relating to preliminary investigation being unnecessary.

8.9 EDWARD VII., A. 1909.

Section 784 of the said Act is repealed and a new section 784 substituted, relating to assessors and their qualifications.

Section 785 of the said Act is repealed.

Section 786 of the said Act is repealed and a new section 786 substituted relating to oaths of commissioners and assessors.

Section 796 of the said Act is repealed and a new section 796 substituted, relating to the court requiring delivery of certificates.

Paragraphs (i) and (j) of section 565 of the said Act are amended in respect of the meaning of the word passenger on a steamboat.

Chapter 47 of the Statutes of 1907 is repealed.

Sections 566-7-8 of the Canada Shipping Act are repealed and a new section enacted as section 566 of the said Act, relating to the use of boilers in steamboats belonging to His Majesty, and also including steam dredges, floating elevators, steam yachts and freight boats, as regards the yearly rate or duty and carrying of life buoys.

Section 591 of the said Act is repealed and a new section 591 substituted, relating to injury to steamboats.

Section 598 of the said Act is repealed and a new section 598 substituted in regard of an inspector seeing that steamboats have proper lights.

Section 621 of the said Act is amended by striking out the word 'passenger,' relating to wire ropes and bell-pulls.

Section 632 is repealed and a new section 632 substituted, relating to temporary certificates to act as engineer.

Paragraph (c) of subsection 3 of section 640 of the said Act was amended, relating to qualification of third-class engineer.

Subsection 1 of section 141 of the said Act is repealed and a new section 641 substituted, forbidding the employment of an engineer without a certificate, and a proviso as to temporary supply of deficiency.

Section 657 of the said Act is repealed and a new section 657 substituted, relating to the omission to report injuries to hulls, machinery and boilers.

Section 666 of the said Act is repealed and a new section 666 substituted, relating to the engagement of a non-qualified engineer, and the penalty.

Section 798 is repealed and a new section 798 substituted, relating to the copy of judgment to be given.

Section 799 of the said Act is repealed and a new section 799 substituted, relating to judgment to be sent to the minister, also the certificate of the officer affected.

Subsection 3 of section 801 is amended, relating to the cancellation or suspension of holders of certificates.

Section 806 of the said Act is repealed and a new section 806 substituted, relating to rehearing of a case.

Section 806 is also amended by substituting 806A relating to no appeal beyond rehearing and proceedings to be quashed for want of form.

Section 820 of said Act is repealed and a new section 820 substituted, relating to penalty for failure to deliver a certificate.

The schedule to the said Act is amended by adding certain forms.

An Act, Chapter 66, relating to signal dues at Halifax, was enacted.

F. GOURDEAU, *Lt.-Col.*,
Deputy Minister of Marine and Fisheries.

OTTAWA, April 1, 1908.

APPENDIX No. 1.

ANNUAL REPORT OF THE CHIEF ENGINEER OF THE DEPARTMENT
OF MARINE AND FISHERIES.

The Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit a report of the work done in the several services under the supervision of this office during the twelve months ended March 31, 1908.

This embraces work done at departmental headquarters on the construction of lighthouses, lightships and fog-alarms, the supervision of construction and repairs of lifeboats; the administration of the vote for the removal of wrecks and obstructions in navigable waters; tidal and current surveys; and the publication, examination and correction of hydrographic charts; construction of and repairs to fish hatcheries and refrigerators; engineering points in connection with the construction and maintenance of fish-passes; supervision of surveys of oyster beds; examination of applications for foreshore, wharf and other lots as they affect the interests of navigation; preparation and publication of notices to mariners and hydrographic notes, &c.

STAFF.

There is a special staff appointed for the tidal and current survey work; the remainder of the work of the branch is attended to by the general staff of the office.

The following changes have been made during the year in the staff of my office :

On May 1, 1907, Mr. E. M. Longtin, formerly on the department's hydrographic work was transferred to my branch as assistant engineer at a salary of \$1,000.

On May 6, 1907, Mr. A. Martin was appointed a draughtsman at \$75 per month.

On July 8, 1907, Mr. G. E. Dowling resigned his position as a draughtsman.

On July 17, 1907, Mr. A. E. Dion was appointed a draughtsman at \$70 per month, but resigned his appointment on August 30.

On July 18, 1907, Mr. T. E. Calderon was appointed a draughtsman at a salary of \$75 per month.

On October 23, Mr. T. N. Binks was appointed a draughtsman at \$50 per month.

During the year assistants from the office were increasingly employed in supervising work of construction; M. de Miffonis in inspecting the construction of a reinforced concrete tower on Little Hope island, and in building a similar lighthouse at Cape Anguille, Mr. Longtin in superintending work at the Lower Traverse; and Mr. Surtees on inspection work.

The system of having district resident engineers to attend to details of construction and repair work is found to work well, as it would have been impossible to attend to the great quantity of work now involved in the improvement of aids to navigation from headquarters. I wish to bear testimony to the efficient services of Mr. Légère in the maritime provinces; Mr. P. E. Parent in Quebec, and Mr. Murphy on the upper lakes. It seems desirable that the same system should be extended to British Columbia.

OFFICE WORK.

A large proportion of the work done by the general staff of the branch consists in the construction, repair or improvement of light buildings, fog-alarms, beacons and other aids to navigation. Full details of the work done in this connection during the

8-9 EDWARD VII., A. 1909

past twelve months are contained in a separate report which is attached hereto. (Inclosure A.)

Plans and specifications for all important new buildings and repairs, new vessels, &c., are made or approved in this office.

The following table indicates the work done in the drafting office during the twelve months ended March 31, 1908 :—

Description of Work.	Plans Designed.	Plans Received.	Copies Made.
Lighthouse towers and dwellings	34	4	177
Fog alarm buildings	13	2	74
Details	45	26	301
Wharfs, piers, &c	2	1	13
Outbuildings	1		22
Machinery	1	23	12
Lanterns and illuminating apparatus		6	3
Fish hatcheries	1	2	11
Marine hospitals			9
Steamers			9
Land surveys	2	24	40
Plans relating to foreshore	3	196	36
Miscellaneous	9	189	200
	111	473	913

Total plans for twelve months from April 1, 1907 to March 31, 1908	1,497
Charts received and recorded	139
Charts received and entered in chart books	36
Photographs received and recorded	288
Specifications written	35
Notices to mariners issued (comprising 363 subjects)	137

PUBLICATIONS.

The work of preparing and issuing notices to mariners continues to be heavy and urgent; during the past twelve months, 137 notices, covering 363 subjects, having been published. Amongst important notices, involving considerable labour in compilation, and representing useful work done in the department, are:—

An index to last year's notices; sailing directions and re-arrangement of lights and buoyage at Limekiln crossing, Ont.; list of aids to navigation in Rideau canal, Ont., from Merrickville to Edmunds' lock; list of aids to navigation in Restigouche river, N.B.; hydrographic information respecting Masset harbour and buoyage in Dodd and Cunningham passages, B.C., and hydrographic information respecting dangers and sailing directions in Parry passage, Queen Charlotte islands, B.C.

During the past twelve months notices relating to waters outside of Canada were issued, covering 13 items relating to Newfoundland and Labrador, 1 item relating to the Atlantic, 6 to the inland, and 7 to the Pacific waters of the United States, as well as 16 notices referring to transatlantic subjects. No attempt is made to issue a complete synopsis of British or foreign notices, but merely to republish items likely to be of immediate interest to Canadian vessels, or to vessels leaving Canadian ports for the more important or frequented foreign ports.

REMOVAL OF OBSTRUCTIONS.

During the past twelve months the following work has been done, under the annual appropriation for the removal of wrecks and obstructions:—

The schooner *Southampton*, which sank in Sarnia bay, Ont., was moved by the Reid Wrecking Company, of Sarnia, the contract price being \$950.

Tenders were called for the removal of the wrecked schooner *M. C. McLean*, which

SESSIONAL PAPER No. 21

sank near the wharf at Baddeck, N.S. One tender only was received, which being considered too high, the owner of the vessel was requested to remove the wreck at once.

The schooner *Nova Stella* sank in Amherst harbour, Magdalen islands, in October, 1907, and tenders were called for its removal. One tender was received, which being considered too high, further action on the matter was delayed until the spring of 1908.

The schooner *Mary H. Ames* sank near Port Daniel, P.Q., and was removed by contract by Mr. Peter Deraiche, of Port Daniel, P.Q., the contract price being \$200.

HYDROGRAPHIC WORK.

The hydrographic surveys of this department are now in charge of Mr. W. J. Stewart, who will make a special report of the year's progress.

All hydrographic notes reaching the department are prepared for publication in this office, and embodied in notices to mariners.

In preparing notices to mariners, special attention has been paid to publishing all information obtainable respecting the hydrography of Canada, and the fullest possible sailing directions have been appended to all descriptions of aids to navigation, so as to increase the value of these notices. During the past twelve months the following hydrographic notes were published:—

Affecting the Atlantic Coast.—Derelict reported in Atlantic ocean; bank reported in Bay of Fundy; government survey steamer at work in Bay of Fundy; Quaco lighthouse destroyed by storm; time signals sent from St. John observatory by wireless telegraphy to Camperdown for transmission to ships within the zone; and removal of wrecks of schooners *Ripple* and *Ida M. Shaffner* from Port Bickerton harbour.

Gulf and River St. Lawrence.—New edition of Gulf telegraph chart published; publication by the department of hydrographic charts, St. Lawrence river, No. 1, (Montreal to Longue Pointe), No. 10 (vicinity of Port St. Francis), No. 11 (Three Rivers to Bécancour), No. 12, (Bécancour to Champlain), No. 13 (Champlain to Pointe Citrouille), No. 14 (Batiscan to Cap Levrard), No. 15 (Cap Levrard to Ste. Emelie) and No. 16 (St. Emelie to Deschambault); changes in pilotage regulations below Quebec; list of aids in Restigouche river, N.B.; alterations in buoyage on Lake St. Peter; and uncharted rocks reported in Watagheistic sound, Hare island and Rocky bay.

Inland waters.—New edition published of Canadian list of lights and fog signals; list of storm signals on great lakes and connecting waters; lights on great lakes to be kept in operation until December 10, 1907; rearrangement of buoyage and magnetic variation in Kingston harbour, Ont.; wreck of *Sir Wilfrid* marked by gas buoy; wreck of tug *W. B. Castle* removed from Detroit river; and uncharted rock reported off north-east Hen island, Lake Erie.

Pacific Coast.—Chart of Prince Rupert harbour issued; list of wireless telegraph stations in British Columbia; hydrographic notes and sailing directions respecting Lofty island, Petrel channel, and Parry passage and approaches; uncharted rocks and dangers reported in Tofino inlet, Dixon entrance off Frederick island, between Larcomb and Frank islands, Skinecattle inlet, Mosquito harbour, Zayas island, Hand island, and shoals reported in southern approach to Prince Rupert harbour; hydrographic information respecting Masset harbour, Graham island; and directions for entering Naden harbour, Queen Charlotte islands.

ICE-BREAKING.

The work of ice-breaking in Thunder bay and vicinity was continued during the past year. Contracts for the work were awarded, as in previous years, and the work was carried out in a satisfactory manner.

(1) A three years' contract was entered into with the Canadian Towing and Wrecking Company, Limited, of Port Arthur, to keep the harbours of Port Arthur,

8-9 EDWARD VII., A. 1909

Fort William and West Fort William open for navigation until December 17, in each year, and to open the same each spring in time to admit upward bound vessels from Sault Ste. Marie to enter the harbours as soon as that canal was opened for navigation. The contract price is \$30,000 per season, which also includes an agreement to remove all the lightkeepers in the vicinity from their stations at the close of navigation in each year. The contractors carried out the work as above specified; the whole being under the constant supervision of the respective harbour masters of the ports referred to.

Strong representations were made to the department that it was extremely necessary to see that the receiving ports at the eastern end of the chain of lakes were kept open, to correspond with the harbours of Port Arthur, and Fort William. Three ports were recommended by the Marine Association of Canada for favourable consideration in this respect, and arrangements were made as follows :—

(2) A contract was entered into with the Midland Towing and Wrecking Company, Limited, of Midland, to keep the harbour of Midland open until the close of navigation of 1907, for the sum of \$4,000.

(3) A contract was entered into with Mr. C. E. Pratt, of Parry Sound, to keep the harbour of Parry Sound open until the close of navigation of 1907, for the sum of \$300.

(4) A contract was entered into with Messrs. R. S. Fisher and A. Montgomery, of Collingwood, to keep the harbour of Collingwood open until the close of navigation of 1907, for the sum of \$300.

In each of the above cases the work was satisfactorily done, under the supervision of the harbour masters of the respective ports.

TIDAL AND CURRENT SURVEY.

In this survey under the direction of Dr. W. B. Dawson, substantial progress has been made both in the tidal branch and in the investigation of the currents. The quantity of information sent out in reply to special requests is steadily increasing. This is of a very varied character, including such matters as the low-water datum for hydrographic surveys, tide levels for dredging purposes, the range of the tide required in wrecking operations, water temperature desired for investigations of fish immigration, &c.; besides requests for information which can be found in reports and tide tables already published. The need for information on the tides at the smaller harbours is also constantly increasing, to meet the growing tendency to ship lumber and other produce direct from the smaller localities.

Investigation of the Currents.—The work indicated as proposed, in the last report, has been fully carried out; the C.G.S. *Gulnare* being employed throughout the season in completing the investigation of the currents in the Bay of Fundy. The observations of the two seasons of 1904 and 1907 were reduced to a uniform basis, with relation to the tide at St. John, N.B., so as to bring the movements of the current into correspondence with the tide itself, as given in the tide tables for that port. To secure a complete and satisfactory comparison, the observations in the steamer were taken continuously, day and night. The results, when brought to the most concise and practical form, are published as ‘Tables of hourly Direction and Velocity of the Currents, and the time of Slack Water.’ The region included in these tables comprises the lower part of the Bay of Fundy below St. John, and its approaches as far as Cape Sable. A chart, accompanying these tables, shows the chief results in a graphic manner. These are the only tables of the state of the current, hour by hour, similar to those prepared for the coasts of Europe, which have yet been published for any North American waters of extended area.

Staff.—These investigations of the current were carried out under the personal supervision of Dr. Dawson, with the assistance of Mr. S. C. Hayden in both seasons, and Mr. H. W. Jones in 1904 and Mr. C. L. Blois in 1907. The night observations

SESSIONAL PAPER No. 21

were taken by assistants engaged temporarily. Captain T. G. Taylor, the master of the *Gulnare*, gave valuable co-operation in the work, in addition to his ordinary duties. Mr. Hayden had also charge of the meteorological observations on board, and Mr. Jones afterwards assisted largely in the office reduction of the observations.

The same staff carry out the calculation and publication of the tide tables during the winter season, together with the reduction of the tidal observations on which they are based; and also the erection, inspection and repair of the tidal stations themselves.

Tidal Stations and Tide Tables.—The principal tidal stations on the St. Lawrence and Atlantic coasts have been maintained in continuous operation throughout the year; as well as the six stations on the Pacific coast. A new station at Charlottetown, P.E.I., has been erected and fully equipped. This will serve as a principal station for Northumberland strait, and will place that region on an independent basis. The tidal station at St. Paul island has also been rebuilt; as this is essential as a port of reference, in view of proposed observations in Miramichi bay and Chaleur bay. In British Columbia, the tidal stations have been inspected and put in repair; and the tide gauge at Vancouver has been replaced by a special type of recording instrument which is better adapted to the tide in that harbour.

The information published in the tide tables is being extended year by year. The principal additions for Eastern Canada are the full tables for Cap à la Roche and Beaujeu bar, which are the shallowest points in the St. Lawrence ship channel above and below Quebec, until dredging operations are completed. The demand for local information, beyond the scope of the tidal tables, is also on the increase. This is prepared by extra work in the office, without involving expense, and is published in local papers, tourist guides, &c., or is posted as type-written tables in hotels at sea-side resorts, where it is much appreciated.

In the tide tables for British Columbia the principal additions to be noted are tables for the turn of the current in First narrows at the mouth of Vancouver harbour. Similar tables are annually calculated for Active pass and Porlier pass; and the value of these is apparent, as the maximum strength of the current is from five to nine knots, and the traffic through these passes is largely handled by tugs which have to time their trips to accord with slack water. There is also a special table which shows the variation of the time of the tide at Prince Rupert, the terminus of the Grand Trunk Pacific Railway. New data are also given for ports at the mouth of the Skeena river, and for the Queen Charlotte islands, where the harbours are beginning to assume importance.

The edition of the tide tables has now reached a total of 12,000. This includes two pocket editions for Quebec and St. John, chiefly for the convenience of the pilot service. A large proportion of these tide tables are addressed individually, besides the supplies sent to the various shipping companies and steamship lines.

The Great Lakes.—Arrangements have been made for observations on the Canadian shores of the great lakes, which will give valuable comparisons with those on the United States side, as they will show the raising and lowering of the water in the harbours under the influence of the wind. The record of the water level in Lake Ontario, as recorded at Toronto by the harbour master, will hereafter be forwarded to this Survey.

Proposed work for the season of 1908.—During this season it is proposed to make an investigation of the currents in Northumberland strait. It is known that these currents are very complex, so much so that mariners usually suppose that they are chiefly governed by the wind. But such preliminary observations as have been obtained by this Survey indicate that they are in reality dominated by laws of an astronomical nature, like the tides themselves. It is thus hoped that when they are systematically investigated with modern appliances, it may prove possible to bring the results into such relation with the tide as may be sufficiently simple for practical

8-9 EDWARD VII., A. 1909

purposes. With this view, the observations will be continued day and night, to obtain a complete basis of fact.

The currents in this strait have much importance, as their strength amounts to nearly three knots; and a knowledge of their true nature would throw light on the movement of the ice during winter navigation, as well as in the summer season.

Respectfully submitted,

WM. P. ANDERSON,

Chief Engineer.

Chief Engineer's Office,

Department of Marine and Fisheries,

Ottawa, Canada, April 1, 1908.

(INCLOSURE A.)

DETAILED REPORT OF THE CHIEF ENGINEER OF THE DEPARTMENT
OF MARINE AND FISHERIES ON CONSTRUCTION, ESTABLISHMENT
AND IMPROVEMENT OF LIGHTHOUSES AND OTHER AIDS TO NAVI-
GATION UP TO MARCH 31, 1908.

To the Deputy Minister,

Department of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit a detailed report on work done in the construction and establishment of aids to navigation for the twelve months ending March 31, 1908.

NOVA SCOTIA

NEW AIDS TO NAVIGATION.

Port Greville.—A lighthouse was established at this port. It is an inclosed wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern; the whole painted white. The tower is 27 feet high from its base to the ventilator on the lantern. The work was done by contract, by Mr. John D. Reid, of Wallace bay, N.S., the contract price being \$790.

Bass River.—A lighthouse was built on the west side of the mouth of Bass river, Cobequid bay. The tower stands on the shore about 400 feet northward of and inside the point on the west side of the mouth of Bass river. It is an inclosed wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. The building is 32 feet high from its base to the ventilator on the lantern. The light is a fixed red light, elevated 39 feet above high water mark, and visible 7 miles from all points of approach by water. The illuminating apparatus is dioptric of the sixth order.

The work was done by contract, by Mr. S. Beckwith, of Bass river, N.S., the contract price being \$450, but an additional sum of \$200 was allowed him on account of the lighthouse site being changed after he had brought all his materials to the old site, and had started construction work.

Little Hope.—A reinforced steel concrete cylindrical tower was erected at this station. It is 10' 6" in diameter, 75 feet high from its base to the lantern platform.

SESSIONAL PAPER No. 21

and 95 feet high to the vane on the lantern. It is surmounted by a circular iron lantern, and the tower is strengthened throughout its whole height by six concrete ribs. A reinforced concrete stairway is constructed within the tower from its base to the lightroom floor. The tower was built by contract by the Steel Concrete Company, Limited, of Montreal, the contract price being \$7,250. A steel framed concrete dwelling for the keeper was also erected, the steel framework being supplied by Messrs. I. Matheson & Co., of New Glasgow, N.S., for \$800, and the building erected by day's labour, under the supervision of the Nova Scotia agency, at a cost of \$2,860.91.

Harbour Island.—The wooden lighthouse tower and outbuildings mentioned in last year's annual report, as being under construction, were completed. The lighthouse consists of a square wooden building, with a square wooden lantern rising from the middle of its hip roof. The sides of the building and lantern are painted white, and the roofs are painted red. The height of the lighthouse from its base to the top of the ventilator on the lantern is 35 feet.

The light is an occulting dioptric white light of the sixth order, visible for 8 seconds and eclipsed for 4 seconds, alternately. It is elevated 37 feet above high water mark, and visible 11 miles. The work was done by contract by Mr. Stewart C. McMillan, of Isaacs Harbour, N.S., the contract price being \$1,595.

Goillon Rock.—A beacon was erected on Goillon rock, Lennox passage. It consists of an octagonal concrete pyramid, 15½ feet high. The work was done by day's labour under the Nova Scotia agency, at a cost of \$762.77.

Fourchu Head.—A lighthouse was established on Fourchu head (the point on the south side of Fourchu inlet), Cape Breton. The tower stands near the end of the point, 130 feet back from high water mark, on land elevated 20 feet above high water mark. The tower is an inclosed wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. The height of the tower from its base to the top of the ventilator on the lantern is 32 feet. The light is a fixed red dioptric light of the sixth order, elevated 48 feet above high water mark, and visible 8 miles from all points of approach. The work was done by contract, by Mr. Lawrence Mury, of Amherst West, N.S., the contract price being \$700.

Glace Bay.—Range light towers were erected in Glace cove, Glace bay, and were put in operation on December 15, 1907. The front tower stands on the north pier at the entrance to Glace cove, 10 feet from its outer end. The tower is an inclosed wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. The height of the tower from its base to the top of the ventilator on the lantern is 22 feet. The light is fixed red dioptric of the sixth order, elevated 23 feet above high water mark, and visible 6 miles from all points of approach.

The back tower stands on the south side of Glace cove, about 75 feet back from the water's edge, and distant 1,900 feet from the front tower. It is an inclosed wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. The height of the tower from its base to the top of the ventilator on the lantern is 42 feet. The light is fixed red catoptric, elevated 51 feet above high water mark, and visible 8 miles in, and over a small arc on each side of, the line of range. The lights in one lead into the entrance of the harbour between the north and south piers, clear of all obstructions. The work was done by contract by Mr. Angus McCaskill, of Glace Bay, N.S., the contract price being \$1,375, and extras of \$40 were allowed.

Amherst.—Two wooden range light towers were erected at Amherst. The towers are square in plan, with sloping sides, lantern galleries, and are surmounted by square wooden lanterns. The back tower, on a concrete foundation, is 20 feet square at its base and is 42½ feet high from base to vane on the ventilator. The front tower.

8-9 EDWARD VII., A. 1909

on a concrete foundation, is 12 feet square at its base, and is $22\frac{1}{2}$ feet high from base to ventilator on lantern. The work was done by contract, by Mr. J. H. McKay, of Amherst, the contract price being \$2,300.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Apple River.—A new brick chimney, 45 feet high, was built; a floor put in under the cistern; the fog alarm building enlarged to accommodate the engine; and the coal shed also enlarged. The walls of the boiler room were completely lined with brick and in other ways renovated. The work was done by day's labour, under the Nova Scotia agency, for \$1,329.91.

Cape D'Or.—The fog alarm machinery underwent some repairs and improvements, and the alarm was changed so as to sound one blast of six seconds' duration every minute, the work being done by day's labour, under the Nova Scotia agency, for \$695.87.

Cape Sharp.—For the purpose of increasing the power of the fog alarm, a 3-inch diaphone was installed in the place of the $1\frac{1}{2}$ -inch diaphone formerly in use there. A new air tank was also supplied and a countershaft erected for driving the timing device. An addition to the fog alarm building had also to be made to accommodate the extra tanks required to operate the larger diaphone. The diaphone plant was obtained from the Canadian Fog Signal Company, of Toronto, in exchange for the old $1\frac{1}{2}$ -inch plant and an additional sum of \$3,300. The alterations to the building and machinery were performed by day's labour, under the Nova Scotia agency, and cost \$594.89.

Wedge Island.—A new boathouse was erected, the work being done by day's labour, at a cost of \$429.99.

Cranberry Island.—A new dwelling house was erected for the fog alarm engineer. It is of framework, 26' x 24' x 14' 4" high, the foundation walls and piers being built of concrete and the whole of the exterior painted. The building was erected by Thos. O'Neil, of Salmon River, N.S., by contract for \$2,200. In addition to the above an oil store is now in course of construction by day's labour.

Grande Digue.—The pole light formerly maintained at Grande Digue, Lennox passage, was replaced by a light shown from a lighthouse tower, erected on the south side of the road leading to the old wharf, and distant 70 feet southward of the site of the old pole light. The tower is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. The height of the tower from its base to the top of the ventilator on the lantern is 32 feet. The light is fixed red dioptric of the sixth order, elevated 29 feet above high water mark, and visible 7 miles from all points of approach. The work was performed by contract by Lawrence Mury, of West Arichat, N.S., the contract price being \$452.

Louisburg.—The siren was replaced by a 3-inch diaphone, operated by compressed air, giving 2 blasts of 3 seconds' duration every 75 seconds. The diaphone was supplied by the Canadian Fog Signal Company, of Toronto, for \$2,300. In order to accommodate this diaphone, the fog alarm building was enlarged, and repairs made to it, the work being done by day's labour, under the Nova Scotia agency, at a cost of \$1,393.71.

In connection with the submarine signal bell station, established at Louisburg, the necessary building to contain the bell, &c., was erected by day's labour, at a cost of \$993.92.

Scatari.—Repairs and improvements were executed at this fog alarm station. Two new 50 horse power Robb-Mumford boilers were installed and smokestack breeching supplied, the old brick stack being torn down. Repairs were made to the cistern and boiler-room floor and caulking done to boiler. The stack breeching was supplied

SESSIONAL PAPER No. 21

by Messrs. I. Matheson & Co., of New Glasgow, for \$72.50, and the installation of boilers and repairs was done by day's labour, under the Nova Scotia agency, for \$902.34.

Low point.—A new 40-horse-power Robb-Mumford boiler was installed at the fog-alarm station, supplied by the Robb Engineering Company, of Amherst, N.S., for \$1,008.

McKenzie point.—The lighthouse tower was found to be in a very decayed condition, and it was considered advisable not to repair the old building but to erect a new tower, to carry a 7-foot lantern. A new wooden tower is, therefore, in course of construction, and will be completed during the coming season. The keeper's dwelling is also undergoing repairs. The work is being done by day's labour, under the Nova Scotia agency, the cost to date being \$212.54.

Cape George.—A new wooden lighthouse tower and keeper's dwelling were erected at this station in Antigonish county. The tower is octagonal in plan, with sloping sides, surmounted by an octagonal iron lantern, and is 54 feet 6 inches high from its base to apex of lantern. The dwelling is of framework, on concrete foundation, and is 26 feet by 24 feet by 14 feet 4 inches high. The work was done by contract by Mr. E. F. Munro, of Westville, N.S., the contract price being \$3,097, but \$213.56 were allowed him in addition for changes to buildings which were afterwards found necessary.

North cape.—A 3-inch diaphone was installed in the new fog-alarm building described in last year's annual report. It was purchased from the Canadian Fog Signal Company, of Toronto, and cost \$4,600. In addition to the above a double dwelling house for the use of the engineers is now in course of construction and will be completed during the coming season. The construction work at this station is being done by day labour, and the cost this year has been \$6,248.57.

Pictou island.—A new dwelling was erected for the lightkeeper at this station. It is of framework, 26 feet 4 inches by 20 feet 10 inches by 15 feet high, and the work was done by day labour, under the Nova Scotia agency at a cost of \$782.39.

Amet island.—Further repairs were found necessary to the breakwater, 100 feet of cribwork and 50 feet of the stone wall were carried away by storm and had to be renovated, as well as a great deal of the covering all around the work. The work was done by day labour, under the supervision of the Nova Scotia agency, at a cost of \$1,292.01.

Cape Race.—The reinforced concrete tower, mentioned in last year's annual report as being under construction, was completed. It is a cylindrical tower, painted red and white in broad vertical stripes, and is surmounted by a circular iron lantern. The tower is 100 feet high from its base to vane on lantern, and the light is elevated 165 feet above high water and visible nineteen miles from all points of approach by water. The tower was erected by the Steel Concrete Company, Limited, of Montreal, for \$4,800. On April 1, 1907, the steam fog whistle, formerly in use at the station, was replaced by a 5-inch diaphone which was supplied by the Canadian Fog Signal Company, of Toronto, for \$650. The lightkeeper's dwelling also required considerable repairs, the clapboarding and shingling being renovated and the windows and roof put into proper condition. A new double dwelling for the fog-alarm engineers is also in course of construction. The whole of the above erection work is being done by day labour, under the Nova Scotia agency, and the cost, this year, has been \$5,645.46.

The following lighthouses were repainted with white and red stripes or bands, to make them more conspicuous when snow is on the ground:—Brier island, Seal island, Sambro, Beaver island, Country harbour, Whitehead island, and Guion island.

In addition to the above, minor repairs were also executed at the following stations.

Eddy point, retaining wall and repairs.. . . .	\$ 149 40
False passage, repairs to beacon.. . . .	268 32
Mauger beach, triplex pump and repairs.. . . .	158 12
Mitchener point, site for lighthouse.. . . .	143 57

NEW BRUNSWICK.

NEW AIDS TO NAVIGATION.

Long point.—A light was established at Long point, Belleisle bay, St. John river. The fixed white light, elevated 38 feet above high water mark, is shown from a lens lantern hoisted on a mast, and is visible 6 miles from all points of approach. The mast stands on land 14 feet above high water mark and is 27 feet high. The work was done by day's labour under the New Brunswick agency, at a cost of \$193.39.

Anderson hollow.—A mast light was established on the breakwater 22 feet above high water. A crib 9 feet square, 3 feet 6 inches high, was built around the mast, with a ballast floor filled in with stone. The work was done by day's labour and cost \$46.76.

Peck point.—It has been decided to move the lighthouse tower, now at Ward point, to this point and to install, in addition, a fog alarm there. A 1-inch diaphone plant and machines has, therefore been supplied by the Canadian Fog Signal Company, of Toronto, for \$997.56, and will be installed during the coming season.

Cocagne.—The range lights, described in last year's annual report, and stated as under construction, were completed, the work being done by day labour, under the New Brunswick agency, the cost to complete the work being \$699.17.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Gannet rock.—The fog alarm building, mentioned in last year's annual report as under construction, has been completed, and the 5-inch diaphone plant, which was purchased last year from the Canadian Fog Signal Company, of Toronto, has been installed.

The fog alarm building stands on the southern end of Gannet rock, distant about 40 feet from the dwelling attached to the lighthouse tower. It is a rectangular wooden building, painted white, with the roof red. The horn, elevated 37 feet above high water mark, projects from the south side of the fog alarm building and points due south. The work was done by day's labour, under the New Brunswick agency, and the cost, this year, has been \$4,718.16.

Passamaquoddy bay.—Extensive repairs were made to the cribwork upon which the St. Andrews east beacon light stands. The block was filled with stone and concrete, and all timbers, planking, &c., renewed. The work was done by day labour, under the New Brunswick agency, and cost \$2,535.45.

Tiner point.—The water pipes at this fog alarm station required relaying, to prevent them from freezing in the winter. A trench was dug from a brook at a point 900 feet back from the fog alarm building, and the piping relaid below the frost line. The work was done by day labour, under the New Brunswick agency, and cost \$426.72.

Negro Head.—The submarine station, mentioned in last year's annual report as under construction, was completed. It is a one-story framed building, 20 feet square, attached to the east side of the Tiner point fog alarm building, and will contain the

SESSIONAL PAPER No. 21

machinery for operating two submarine electric bells. The construction work was performed by day's labour, under the New Brunswick agency, and cost \$1,707.19.

Wilmot Bluff.—A new wooden lighthouse tower is in course of construction at this station to replace the mast light hitherto exhibited here. The work is being done by contract, by Mr. John C. Palmer, of Kars, N.B., the contract price being \$1,060.

Cape Spencer.—A wooden fog alarm building, with a large concrete cistern under, to contain a 3-inch diaphone plant, was erected by contract, by Mr. Edward Bates, of St. John, N.B., the contract price being \$2,100 for the building and \$550 extra for putting in concrete cistern. The diaphone plant was furnished by the Canadian Fog Signal Company, of Toronto, for \$7,250, and has been installed. In addition to the above works, a dwelling for the engineer will be erected during the coming season. The fog alarm plant was installed by day's labour, at a cost of \$397.16.

Quaco.—The breakwater lighthouse tower was improved by cutting down the corner posts to the level of the lantern sills and building a new wooden lantern, with vertical sides, from which a better light is shown. The work was done by day labour and cost \$262.29. During a heavy storm, however, on February 1, 1908, the whole lighthouse was swept away together with 60 feet of outer end of the breakwater. A temporary mast light was immediately erected by day labour, pending the re-erection of a new end to the breakwater.

Cape Tormentine.—A new lighthouse tower, from which Cape Tormentine back range light is shown, was erected 70 feet back in the line of range from the iceboat house; and the exhibition of a light from the cupola of the iceboat house discontinued. The new tower stands on the top of the bank, 100 feet back from the water's edge, near the inner end of the pier. It is distant 2,620 feet from the front light on the pier. The tower is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. It is 32 feet high from its base to the top of the ventilator on the lantern. The light is fixed white, is dioptric of the seventh order, elevated 46 feet above high water mark, and visible 12 miles from all points of approach by water. The work was done by day labour under the supervision of the New Brunswick agency, and cost \$973.85.

Buctouche.—The sea having encroached considerably upon the bank close to the lighthouse tower, an extra 375 feet of close pilework was built as an extension to the present protection work. A waling was fastened to the piles, just above high water mark, and cross-ties, 8 feet long, secured to the piles and waling. The work was done by day labour, under the New Brunswick agency, and cost \$818.52.

Escuminac.—The old fog alarm building underwent further alterations and improvements to receive the new 3-inch diaphone plant ordered for this station. The plant was furnished by the Canadian Fog Signal Company, of Toronto, for \$4,600, and the cost of installing the machinery and making the necessary alterations to the building, which was done by day labour, was \$4,869.59.

Pokemouche.—A protection and boathouse block, 40 feet long, with a ballast floor, was built at this station, as a protection to the beach in the rear of the lighthouse, and also to make the landing of boats less dangerous. The work was done by day labour, and cost \$218.

Shippigan.—The lighthouse tower at this station was changed internally, to receive a new third order single flashing light. The cost of altering the tower was \$314.76, the work was done by day labour.

Goose lake.—Considerable repairs were made to the protection work at this station, the work being done by day labour, at a cost of \$670.50.

Little Belledune.—A lighthouse tower was erected at this station, in place of the mast light formerly exhibited. It is an inclosed wooden tower, octagonal in plan, with sloping sides, surmounted by an octagonal iron lantern, and is 58 feet 6 inches high, from its base to the apex of the lantern roof. The work was done by contract by Mr. S. Gammon, of Bathurst, N.B., the contract price being \$1,100. A keeper's dwelling will also be constructed during the coming season.

In addition to the above, minor repairs were executed at the following stations:—

West Head, Quaco, 104 rods, extension of road.. . . .	\$ 91 20
Enrage, Cape, repairs to station.. . . .	25 00
Hatfield point, repairs to station.. . . .	36 50
Heron island, removing tower.. . . .	210 61
Lepreau point, fog-alarm repairs.. . . .	74 62
North Tracadie, cribwork repairs.. . . .	58 58
Sapin point, repairs to station.. . . .	102 50

PRINCE EDWARD ISLAND.

NEW AIDS TO NAVIGATION.

Panmure island.—A fog-alarm building to contain a 3-inch diaphone plant, was erected on Panmure island. It is a rectangular wooden building, 31 feet by 24 feet, 13 feet high to wall plate, and was erected by contract, by Mr. B. D. Huntley, of Charlottetown, for \$2,800. Additional excavation work for the machinery foundations was afterwards found necessary, as also a room for the diaphone, and this work was carried out by Mr. B. D. Huntley, for an additional sum of \$433.55. The 3-inch diaphone plant was furnished by the Canadian Fog Signal Company, of Toronto, for \$7,100, and was installed by day labour, under the direction of the Charlottetown agency, for \$497.27.

Warren farm.—The range lights described and stated in last year's annual report to be under construction, were completed, the work being done by day labour, under the Charlottetown agency, the cost complete being \$326.64.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Charlottetown.—An extension work to the main wharf of the department's agency was completed, and the wharf put in first-class order. A large quantity of piles were procured for the outer faces of the wharf, and the necessary stone ballast for filling. The work was done by day labour, under the supervision of the Charlottetown agency, at a cost, this year, of \$1,153.17.

East point.—Repairs were executed to the fog-alarm building, by day's labour, for \$32.90.

QUEBEC.

NEW AIDS TO NAVIGATION.

Carleton point.—The small lighthouse tower described in last year's annual report, and built in the department's workshops at Quebec, was taken down and erected on the site by day labour, under the direction of the Quebec agency, the cost of erection being \$286.18.

Cap Anguille.—The fog alarm building and reinforced steel concrete tower, mentioned in last year's annual report as under construction, were practically completed during the present year. The tower is octagonal in plan, 10 feet in diameter, sup-

SESSIONAL PAPER No. 21

ported with eight flying buttresses, and will be surmounted by a circular iron lantern. The height of the tower, from its base to the apex of the lantern, is 105 feet. The fog alarm building is a wooden structure 54 x 32 feet, 15 feet high to the wall plate, and is built on solid concrete foundations. A 5-inch diaphone plant was furnished by the Canadian Fog Signal Company, of Toronto, for \$5,600, and the machinery is now being installed. In addition to the above works, a dwelling for the fog alarm engineer, a flag house, and an oil store were also erected the whole being done by day labour, under the supervision of the Quebec agency, at a cost, this year, of \$13,329.15.

Esquimaux point.—Two pole lights were erected at this point to form a range, the lanterns exhibiting fixed red lights. The work was done by day labour, and cost \$276.91.

English point.—It is the intention of the department to erect a lighthouse tower at this point during next season, and a framed, wooden tower, combined with a keeper's dwelling was, in consequence, framed during the present season in the agency shops, by day labour, at a cost of \$560.46.

Ramblers Cove.—Two pole lights were erected in Ramblers cove, to form a range, the lanterns exhibiting fixed red lights. The work was done by day's labour, and cost \$206.52.

Trois Pistoles.—A fixed white light, shown from a lens lantern hoisted on a pole, was established; the work being done by day's labour, for \$36.27.

Hospital rock.—The two range towers mentioned in last year's annual report as under construction, were completed during the present year. The front tower is a small square wooden building, and the back one a 3-section steel skeleton tower; the steel tower being supplied by Messrs. Goold, Shapley & Muir, of Brantford, Ont., for \$502.80. The erection work was done by day's labour, under the Quebec agency, at a cost, this year, of \$834.32.

Crane island.—The old wooden lighthouse tower on this island is being replaced by a 5-section steel skeleton tower which will be ready to receive the lantern next spring. The wharf on which the new tower is to stand, was not found sufficiently strong to support the weight, and good substantial concrete pillars carried down to the ground had to be erected through the wharf, to carry the tower. The tower was provided by the Goold, Shapley & Muir Company, of Brantford, Ont., for \$1,184. and the cost of erection and laying the foundation is being done by day's labour, under the Quebec agency, the cost to date being \$2,380.19.

Domaine.—Range lighthouses were erected on the 'Domaine,' at the eastern end of Orleans island, and will be put in operation on the opening of navigation in 1908. The lighthouse towers are wooden structures, square in plan, with sloping sides, surmounted by square wooden lanterns, the whole painted white. Each lighthouse is 32 feet high from its base to the top of the ventilator on the lantern. The lights will be fixed white catoptric lights, visible in the line of range and in the channel. The front tower stands on the north shore of Orleans island, two-fifths of a mile eastward of Rivière du Moulin, and the light is elevated 38 feet above high water mark, and visible 11 miles. The back tower stands on the crest of the hill, 2,573 feet west from the front tower. The light is elevated 122 feet above high water mark, and visible 17 miles. The towers were erected by day's labour, under the supervision of the Quebec agency, at a cost of \$1,713.40.

Ste. Anne de Beaupré.—Two range lighthouse towers are being erected at this place, and will be ready to be put in operation by the spring of 1908. The towers are wooden structures, square in plan, with sloping sides, surmounted by square wooden lanterns, the whole painted white. Each lighthouse is 32 feet high from its base to the top of the ventilator on the lantern. The lights are fixed white catoptric lights,

8-9 EDWARD VII., A. 1909

visible in the line of range and in the channel. The front tower stands on a concrete foundation, 9 feet high, located on the east side of the village wharf at a point 986 feet from its outer extremity. The light is elevated 33 feet above high water and visible eleven miles. The back tower stands on a hillside, north of the main road and west of the village, 4,210 feet from the front tower. The light is elevated 107 feet above high water mark, and visible sixteen miles. The work is being done by day's work, under the supervision of the Quebec agency and has cost to date, \$2,496.41.

Hand fog-horns.—Hand fog-horns were established at St. Siméon, Ste. Irénée and Les Eboulements, which will be used in answer to the fog-signals of vessels, whenever they are heard from the stations.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Bonaventure point.—The lighthouse which formerly stood on point Echouerie was moved to the extremity of Bonaventure point, Chaleur bay. The light shown is a fixed white light, visible from all points of approach by water, the illuminating apparatus being dioptric of the seventh order. The work of removal was done by day's labour, under the Quebec agency and cost \$440.

Port Daniel.—This lighthouse station has been fenced in; the work being done by day's labour for \$297.

Belle Isle.—The upper dam, situated at the lake which supplies water for the fog-alarm at the west end station, was destroyed by the rising and overflowing of the lake during a storm. The dam was, therefore, completely rebuilt. In addition several repairs and improvements were found necessary to the fog-alarm plant, which had temporarily broken down. The work above described was done by day's labour at a cost of \$4,443.24. Repairs to the machinery at the northeast end station, were also carried out by day's labour, under the Quebec agency, at a cost of \$323.93.

Cape Bauld.—The old wooden lighthouse tower at this station is being replaced by a circular cast-iron tower, reinforced by a concrete covering with flying buttresses. The tower was prepared in the department's workshops at Prescott, and is now being erected at the station on a substantial concrete foundation, and is ready to receive the new lantern, which will be installed in the spring of 1908 and the tower completed. It will be 56 feet high from its base to the apex of the lantern roof. In addition to the above work, repairs were executed to the keeper's dwelling and the coal shed at the landing completed. Repairs were also made to the fog-alarm machinery, and two asbestos coverings for the boilers were supplied by the Selater Asbestos Company, of Montreal, for \$156. The whole of the above is being done by day's labour, under the supervision of the Quebec agency; the cost to date has been \$9,453.75.

Cape Norman.—The work started last year of construction of new lighthouse tower, fog alarm building and double dwelling was continued during the present fiscal year. The tower is completed and is a cylindrical iron structure surmounted by a circular iron lantern, and is 57 feet high from its base to the vane on the lantern. The light is elevated 116 feet above high water mark and is visible 16 miles from all points of approach by water. The fog alarm building was completed and the machinery installed, which will be put in operation on the opening of navigation in 1908. The building is a rectangular framed wooden structure, on concrete foundations, and the machinery operates a 3-inch diaphone. The new double dwelling is almost completed and will be ready for occupation during the coming season. A large wooden reservoir was also built under the boiler room. The above work is being done by day's labour, under the supervision of the Quebec agency, and the amount expended on this station this year has been \$11,662.85.

Greenly island.—Extensive repairs were carried out at this station. The lighthouse tower and keeper's dwelling were resingled and repainted; a new oil store 18

SESSIONAL PAPER No. 21

x 12 feet and a new provision store and coal bin 24 x 18 feet were erected ; and repairs made to the road, which included the replacing of the wooden bridgework by a loose stone bed levelled with turf; excavations were also made for a water tank and a concrete tank built. The work was done by day's labour, under the supervision of the Quebec agency, at a cost of \$6,164.31.

Cape Ray.—Some repairs were made to the new dwelling and a coal shed built. In addition a new 5-inch diaphone with spare pistons was provided by the Canadian Fog Signal Company, of Toronto for \$650. The repair work was done by day's labour and cost \$391.

Bird Rocks.—The fog alarm building mentioned in last year's annual report as under construction was completed, and the 3-inch diaphone and machinery which was purchased last year installed. The construction work and installation of the machinery was done by day's labour, under the Quebec agency, the amount expended this year being \$7,594.42. The fog alarm building is a square wooden structure, painted white with the roof red, and the horn, elevated 120 feet above high water mark, projects from the easterly gable of the building.

Anticosti lightship.—Extensive repairs were made to this lightship. The electric plant was overhauled and repaired, as also the diaphone plant, and the compressor valves, &c., readjusted. The port boiler was thoroughly overhauled and repaired and fitted with 200 new boiler tubes; 2 new circulating pumps fitted to each boiler, and the main condenser also repaired and retubed; a new stem and hawse pipe were provided; extra beams fitted to the upper deck; new hardwood beds fitted to windlass which was moved and fitted to upper deck, and auxilliary mooring chains procured; three bunker scuttles were fitted to upper deck, and other repairs executed. The expenditure on this lightship during the present year was \$10,710.26.

Heath point.—In order to accommodate the new powerful illuminating apparatus ordered for this station, the lighthouse tower had to be increased in height thirty feet; a contract was let to the Steel Concrete Company, of Montreal, to do this work, using reinforced concrete for this purpose and sheathing the extension in wood. The contract price was \$6,095, and the tower will shortly be ready to receive the lantern.

Fame point.—A new lighthouse tower was erected at Fame point lightstation and was put in operation on October 1, 1907, when the exhibition of a light from the old lighthouse was discontinued. The new lighthouse consists of a cylindrical iron tower, surmounted by a circular iron lantern, the whole painted red. The tower is 49 feet high from its base to the vane on the lantern. The light is elevated 190 feet above high water mark, and is visible twenty miles from all points of approach by water. The illuminating apparatus is dioptric of the first order. The illuminant will be acetylene, burned under an incandescent mantle. The tower was procured from Messrs. Ives & Company, of Montreal, for \$1,597, and was erected by day's labour under the supervision of the Quebec agency at a cost of \$3,046.85. In addition to the above improvement, a new 5-inch low pressure diaphone with spare pistons was provided for the fog-alarm by the Canadian Fog Signal Company, of Toronto, for \$650.

Cape Magdalen.—A new fog-alarm building, to contain a 5-inch diaphone plant, was erected. It is a rectangular framed wooden structure, 57 feet by 31 feet, 15 feet high. The diaphone plant, which is now being installed, was purchased from the Canadian Fog Signal Company, of Toronto, for \$8,500, and will be ready to be put in operation early in the summer of 1908. In addition to the above works, a reinforced steel concrete tower was erected by contract, by the Steel Concrete Company, of Montreal, for \$3,300. The tower is cylindrical in plan, and will be surmounted by a circular iron lantern early in the season of 1908. The fog-alarm building and the installation of the machinery is being done by day's labour at a cost to date of \$8,667.96.

8-9 EDWARD VII., A. 1909

Seven islands.—A new 3-inch duplicate diaphone plant was installed in a new fog-alarm building, the plant having been purchased last year from the Canadian Fog Signal Company, of Toronto. The fog-alarm building is a rectangular wooden structure, painted white with the roof red. The horn, elevated 184 feet above high water mark, projects from the southerly gable of the building. In addition to the above works, the dwelling portion of the lighthouse tower was thoroughly repaired and the old stone foundation replaced by a solid concrete one. A new oil store was built and equipped with galvanized tanks for coal oil; and the station supplied with a new hoisting gear. The inclined railway from the landing to the top of the island was also completed, and has rendered good service. The work was done by day's labour, under the supervision of the Quebec agency and the cost this year has been \$13,570.17.

Cap Chat.—Repairs were made to this lightstation; a bomb shed was built, and the dwelling improved by the addition of four new rooms, &c. The work was done by day's labour and cost \$316.14.

Ste. Félicité.—A new dwelling house on a solid concrete foundation was erected at this station for the use of the fog alarm engineer. The work was done by day's labour, under the supervision of the Quebec agency, and cost \$3,970.66.

Matane.—A new lighthouse tower was erected at Matane lightstation and was put in operation on November 10, 1907, when the exhibition of a light from the old lighthouse was discontinued. The new tower stands on the west side of the old lighthouse. It is a cylindrical reinforced concrete tower, painted red, surmounted by a circular iron lantern, painted red. The height of the tower from its base to the vane on the lantern is 67 feet. The light is a flashing white light, showing two bright flashes of $\frac{1}{2}$ second duration each, separated by an eclipse of one second duration, and followed by an eclipse of $5\frac{1}{2}$ seconds' duration, the total period being $5\frac{1}{2}$ seconds. The light is elevated 85 feet above high water mark, and visible 15 miles from all points of approach by water. The illuminating apparatus is dioptric of the third order, and the illuminant petroleum vapour, burned under an incandescent mantle. The tower was erected by contract by the Steel Concrete Company, of Montreal, and the contract price was \$3,600.

Little Métis.—A new lighthouse tower was erected at Little Métis lightstation. It is a cylindrical reinforced concrete tower, painted red, surmounted by a circular iron lantern, painted red. The tower was built by contract by the Steel Concrete Company, of Montreal, and the contract price was \$3,900.

Father point. Further repairs and improvements were made to the fog alarm machinery at this station, the work being done by day's labour, at a cost of \$747.61.

Poste St. Martin.—Poste St. Martin range lighthouses Saguenay river, were replaced by new towers, and the old towers torn down. The front tower now stands 650 feet back in the line of range from the site of the old front tower, and about 100 feet back from high water mark. It is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. The height of the tower from its base to the top of the ventilator on the lantern is 47 feet. The light is a fixed white light, elevated 47 feet above high water mark, and visible 7 miles in the line of range. The illuminating apparatus is catoptric. The back tower stands 2,060 feet from the front tower. It consists of a skeleton steel frame, square in plan, with sloping sides, painted brown, surmounted by an inclosed wooden watchroom and a square wooden lantern. The watchroom and the lantern are painted white. The height of the tower from its base to the top of the ventilator on the lantern is 82 feet. The light is a fixed white catoptric light, elevated 81 feet above high water mark, and visible 7 miles in the line of range. The front wooden tower was erected by contract by Mr. G. Bergeron, of Poste St. Martin, for \$597.

SESSIONAL PAPER No. 21

and the back steel tower was purchased from Messrs. Goold, Shapley & Muir, of Brantford, Ont., for \$668.50. The erection of the steel tower was performed by day's labour, under the supervision of the Quebec agency, and cost \$1,367.22.

Prince shoal lightship.—This lightship underwent some minor repairs, which were carried out by day's labour, at a cost of \$740.82.

Red islet lightship.—Minor repairs were executed to this lightship, and were carried out by day's labour for \$531.37.

White island lightship.—Minor repairs were executed to this lightship, the work being done by day's labour for \$420.81.

Lower Traverse.—The pier at the Lower Traverse of St. Roch, constructed in 1903, was severely damaged by ice during the winter of 1906-7. An attempt was made to carry out permanent repairs during the past season, but the difficulties were very great; and towards the close of the season the work done up to that time was destroyed by storm. As it was seen that the crib would probably be destroyed during the winter, everything of value was removed and the station abandoned. The crib is still standing, but is in a dangerous condition, and may fall at any moment.

Upper Traverse.—Extensive repairs were carried out to the cribwork of this pier, and a number of steel plates renewed and others respiked. The work was done by day's labour, under the Quebec agency, for \$4,328.69.

Ste. Famille.—A lighthouse tower was erected to replace the pole from which the front light of the Ste. Famille range has heretofore been shown. It stands on the site of the pole, which, with the shed at its base, has been taken down. The tower is a galvanized steel skeleton structure, square in plan, with sloping sides, surmounted by a wooden watchroom and square wooden lantern. The watchroom and the sides of the lantern are painted white, and the lantern roof red. The height of the tower from its base to the top of the ventilator on the lantern is 82 feet. The light is a fixed white light, elevated 81 feet above high water mark, and visible ten miles in the line of range. The illuminating apparatus is catoptric. The tower was supplied by Messrs Goold, Shapley & Muir, of Brantford, Ontario, for \$668.50 and the erection work was done by day's labour, under the Quebec agency, at a cost of \$2,226.28.

Quebec.—A new lighthouse tower, from which the front light of the Quebec range is now shown, was erected on the northeast corner of Princess Louise embankment, Quebec. The wooden tower and the mast from which the light was formerly shown have been removed. The new tower stands 23 feet back in the line of range from the site of the old light, and 32 feet back from the face of the wharf. It is a steel skeleton tower, square in plan, with sloping sides, painted brown, surmounted by an iron box containing the illuminating apparatus. The height from the base of the tower to the light is 74 feet. The light is a fixed red light, elevated 80 feet above high water mark, and visible four miles in, and over a small arc on each side of, the line of range. The illuminating apparatus consists of a group of three incandescant electric lamps, each of 65-candle power, placed in the foci of paraboloid reflectors. The tower was supplied by Messrs. Goold, Shapley & Muir, of Brantford, Ontario, for \$656.67, and it was erected by day's labour, under the Quebec agency for \$65.14.

MONTREAL AGENCY.

NEW AIDS TO NAVIGATION.

Gentilly.—Two range lighthouses were erected at Gentilly, standing on permanent concrete piers, which are described in last year's annual report. The front light-

8-9 EDWARD VII., A. 1909

house is a square wooden building, painted white, surmounted by a square wooden lantern painted white with the roof red. The building is 23 feet high from its base to the top of the ventilator on the lantern. The fixed white light, elevated 45 feet above the summer level of the river, is visible seven miles in the line of range. The illuminating apparatus is dioptric of the fourth order, and the illuminant petroleum vapour burned under an incandescent mantle. The back tower is erected one and a third miles from the front one. It consists of an open steel framework tower square in plan, with sloping sides, surmounted by an inclosed wooden watchroom and an octagonal iron lantern. The upper part of the side of the framework facing the channel is covered with wooden slatwork. The lantern roof is painted red, the remainder of the lantern, the watchroom, and the slats, are painted white, and the steel frame brown. The height of the tower from its base to the top of the ventilator on the lantern is 81 feet. The fixed white light, elevated 101 feet above the summer level of the river is visible eight miles in the line of range. The illuminating apparatus is dioptric of the fourth order, and the illuminant petroleum vapour, burned under an incandescent mantle. The steel tower was supplied by the Goold, Shapley & Muir Company, of Brantford, Ontario, for \$668.50, and the cost of erecting it and completing the piers, which were practically finished during the preceding year, was \$1,454.40.

Three Rivers.—Two range lighthouse towers were erected at Three Rivers. The front lighthouse stands on a small concrete pier, about 8 feet high and 26 feet square at top. It is a two-section skeleton steel tower, with sloping sides, surmounted by a square wooden lantern. The tower was supplied by the Goold, Shapley & Muir Company, of Brantford, Ontario, and cost \$337.85. The back lighthouse is erected on four concrete blocks and is a steel framework tower, square in plan, with sloping sides, surmounted by an inclosed wooden watchroom and a square wooden lantern. The height of the tower from its base to the ventilator on the lantern is 81 feet. The tower was supplied by Messrs. Goold, Shapley & Muir, of Brantford, Ontario, and cost \$668.50. The work of erection and construction of pier, &c., was performed by day's labour, under the Montreal agency and cost \$2,260.49.

Port St. Francis.—Two permanent concrete piers were constructed and range lights erected upon them. Each of the piers is 42 feet square at base, 25 feet square at top, and 28 feet high. The front pier is surmounted by an octagonal iron lantern, painted red, showing a fixed white catoptric light. The back light is exhibited from an open steel framework tower, square in plan, with sloping sides, surmounted by an inclosed wooden watch-room and octagonal iron lantern. The height of the tower, from its base to apex of lantern, is 64 feet. The tower was supplied by Messrs. Goold, Shapley & Muir, of Brantford, Ont., and cost \$502.80, and the cost of building the piers and erecting the steel tower and front light, which was done by day's labour, under the supervision of the Montreal agency, was \$31,732.97.

Nicolet.—The erection of two range lighthouse towers, mentioned in last year's annual report as under construction, was completed. The front lighthouse stands on a permanent concrete pier, on the flat on the east side of the mouth of Nicolet river. It is a square wooden building, surmounted by a hexagonal wooden lantern, the whole painted white. The building is 19 feet high from its base to the top of the ventilator on the lantern, and the pier is 30 feet high, square in plan, with battered sides. The light is a fixed white catoptric light, elevated 45 feet above the summer level of the river, and visible 4 miles in the line of range. The back tower stands on the site of the old front day beacon, $\frac{3}{4}$ mile below the mouth of Nicolet river, about 600 feet back from the water's edge, and 4,250 feet from the front lighthouse. It consists of an open steel framework, square in plan, with sloping sides, painted white, surmounted by an inclosed wooden watch-room and a square wooden lantern. The side of the framework facing the channel is rendered more conspicuous as a day beacon by

SESSIONAL PAPER No. 21

being covered half way down with wooden slatwork. The lantern roof is painted red, the lantern sides, the watch-room and the slats are painted white. The height of the tower from its base to the top of the ventilator on the lantern is 82 feet. The light is a fixed white catoptric light, elevated 96 feet above the summer level of the river, and visible 5 miles in the line of range. The back skeleton tower was provided by Messrs. Goold, Shapley & Muir, of Brantford, Ont., for \$668.50, and the front wooden tower, as well as the erection of the steel tower, and completion of pier (which latter was practically finished last year), was done by day's labour, under the Montreal agency, at a cost of \$1,903.82.

Pointe du Lac.—The back range light, mentioned in last year's annual report as under construction, was completed. It stands 75 feet from the site of the old lighthouse and 900 feet back from the water's edge. The tower consists of a skeleton steel frame, square in plan, with sloping sides, surmounted by an inclosed wooden watch-room and an octagonal iron lantern. The steel frame is painted brown and the woodwork white. The lantern is painted red. The tower is 102 feet high from its base to the ventilator on the lantern. The light is a fixed white light, elevated 137 feet above the summer level of the river and visible seventeen miles. The illuminating apparatus is dioptric of the fourth order and the illuminant petroleum vapour burned under an incandescent mantle. The steel tower was supplied by Messrs. Goold, Shapley and Muir, of Brantford, Ontario, for \$1,211; and was erected by day's labour, under the Montreal agency, the cost, this year, being \$1,075.05.

Ile Ronde.—Range lights, which will be known as Ile Ronde range, were established in Montreal harbour, to mark the axis of the ship channel from Longue pointe gas buoy, No. 174 M, to Longueuil gas buoy, No. 181 M. The front lighthouse stands on the northeast end of Ile Ronde, on land 18 feet above the summer level of the river. The structure consists of a concrete pier, square in plan, with battered sides, whitewashed, surmounted by an octagonal iron lantern painted red. The height from the base of the pier to the top of the ventilator on the lantern is 32 feet. The light is a fixed white light, elevated 43 feet above the summer level of the river, and visible five miles in the line of range. The illuminating apparatus is catoptric.

The back tower stands on a concrete pier 17 feet high, square in plan, with battered sides, whitewashed, located on the outer end of the Grand pier, about one and a seventh miles from the front lighthouse. The tower consists of an open steel framework, square in plan, with sloping sides, surmounted by an inclosed wooden watchroom and an octagonal iron lantern. The upper part of the side of the framework facing the channel is covered with wooden slatwork. The lantern roof is painted red, the remainder of the lantern, the watchroom and the slats, are painted white, and the steel frame brown. The height of the tower from its base to the top of the ventilator on the lantern is 64 feet. The light is a fixed white light, elevated 97 feet above the summer level of the river, and visible six miles from all points of approach. The illuminating apparatus is dioptric of the fourth order, and the illuminant petroleum vapour, burned under the incandescent mantle. The tower was supplied by the Goold, Shepley & Muir Company, of Brantford, Ontario, for \$502.80; and the erection work as well as construction of pier, &c., was done by day's labour, for \$5,736.52.

Ile des Barques.—This lighthouse tower and permanent concrete pier, which were practically finished last year and are described in last year's annual report, were completed by day's labour, under the Montreal agency, for \$325.83.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

No. 2 curve, Lake St. Peter.—Owing to a heavy jam of ice, in April, 1907, the front lighthouse was wrecked and the other two towers were damaged. The three piers settled down several feet. Piles were driven in around the two back piers and the foundations were further consolidated by filling stone. The front pier was so

badly damaged, that it was demolished down to the water level. Until the lights can be exhibited again, the old lightship, formerly in the locality, was replaced there, and shows a fixed white light at an elevation of 22 feet above the water level. The work is being done by day's labour under the supervision of the Montreal agency, and has cost to date, \$41,064.87.

Gallia bay.—Several piles were driven in around the front pier of this range to consolidate it and both the lighthouses were painted; the work being done by day's labour at a cost of \$288.85.

Ile à la Bague.—As it is the intention of the department to replace the present wooden tower by a skeleton steel tower next spring, a new concrete pier was built over the old wooden one, which was badly decayed. The finished pier is 18 feet square at the top 24 feet square at the base and 6 feet 6 inches high. The work is being done by day's labour, under the Montreal agency, and has cost to date \$985.25.

ONTARIO.

NEW AIDS TO NAVIGATION.

Jones island.—Two range lights were established on the north shore of the Ottawa river, immediately on the county of Two Mountains side of the boundary line between Two Mountains and Argenteuil and were put in operation on September 25, 1907, to lead into the eastern entrance to the channel between Carillon island (locally known as Jones island) and the north shore. The mast from which the front light is shown stands near the shore line. It is 34 feet high, and has attached to it a white diamond-shaped slatted beacon, to make it more conspicuous as a day-mark. The fixed white light, elevated 41 feet above the summer level of the river, is shown from a lantern hoisted on the mast, and is visible four miles. The back range light mast stands 516 feet from the front light. The mast is 48 feet high, and has attached to it a white diamond-shaped slatted beacon facing the channel. The fixed white light, elevated 65 feet above the summer level of the river, is shown from a lantern hoisted on the mast, and is visible four miles in the line of range. The two lights in one lead up the river, marking a channel with nowhere less than 17 feet water, from the intersection of their alignment with that of Pointe aux Anglais and Oka lights.

A light was established on the extreme east point of the small island at the mouth of Argenteuil bay about midway between Carillon island and the mainland and was put in operation on September 25, 1907. The mast from which this light is shown stands 3,183 feet from the front light of the range above described. The mast is 22 feet high, and has attached to it a white diamond-shaped slatted beacon facing the channel. The fixed white light, elevated 24 feet above the summer level of the river, is shown from a lantern hoisted on the mast, and is visible two miles in the line of range. This light in one with the front light of the range above described forms a range, which will be known as Jones island range, leading through a channel between the head of Carillon island and the peninsula forming the outer shore of Argenteuil bay. The work was done by day's labour, under the supervision of Captain Weir, C.G.S. *Maisonneuve*, and cost \$662.05.

Rideau canal.—On July 1, 1907, lights were installed on a stretch of twelve miles of the Rideau canal extending from the locks at Merrickville to Edmunds' lock. The damming of the Rideau river at Merrickville and Kilmarnock created wide areas of drowned lands with shallow water on both sides of the original channel of the river. The lights are intended to show the edges of this original channel, which was at first margined by dead trees and stumps, but so many of the stumps have now disappeared that the lines between the deeper water in the channel and the shoals over the drowned lands are no longer distinguishable. The lights are shown from hand lanterns hung

SESSIONAL PAPER No. 21

inside tripods at an elevation of from 4 to 6 feet above the water. The lanterns on the starboard hand show fixed red lights, and those on the port hand fixed white, visible at least half a mile in all directions except where obscured by the legs of the tripods. The tripods consist of cedar poles driven in shallow water, with the heads bound together. In three cases the tripods are on dry land, on the extremes of canal dykes.

The tripods were placed by the Rideau Lakes Navigation Company for \$250; and are lit by contract by Mr. Byron McGaw, of Smith's Falls, his pay being \$700 per season.

Presqu'île point.—A fog-alarm, consisting of a 3-inch diaphone plant, operated by compressed air, with two air tanks, two compressors, and three duplex pumps, was installed in the new fog-alarm building completed last year. The plant was purchased from the Canadian Fog Signal Company, of Toronto, for \$1,200 and was erected by day's labour, at a cost of \$847.28.

Port Dalhousie.—A fog-alarm plant was installed in the front range lighthouse on the outer end of the east pier, Port Dalhousie entrance to Welland canal. The fog-alarm consists of a diaphone, operated with air compressed by an electric motor, and gives one blast of four seconds' duration every thirty seconds. The resonator, elevated 28 feet above the level of the lake, projects from the north side of the lighthouse. The diaphone plant and electric motor was supplied by the Canadian Fog Signal Company, of Toronto, for \$2,168.96; the electrical connections and motor were installed by the Maple Leaf Rubber Company, for \$245, and the alterations to the lighthouse tower, to prepare it to receive the diaphone plant, were made by contract by the Wilson Building and Contract Company, of St. Catharine, Ontario, for \$250.

Hope island.—A fog-alarm building, to contain a 3-inch diaphone plant, was erected at this station. It is a rectangular framed structure, 53 feet by 30 feet by 16 feet high and is built on concrete foundations. A chimney, 65 feet high, of reinforced concrete was also built. The machinery is now being installed and will be ready to be put in operation during the summer of 1908. The work is being done by day's labour, under the supervision of Mr. M. J. Egan, and has cost to date, inclusive of erection of machinery, \$6,526.40.

Parry Sound.—A permanent departmental wharf for the storing of buoys, &c., and berthing of government steamers is being constructed at Parry Sound which, when completed, will be 250 feet long by 40 feet in breadth. It is being built of cribwork on a levelled bed of stone ballast, and the superstructure will be of concrete with filling of stone ballast. Nos. 1 and 2 cribs have already been placed in position and are now being filled with stone, and the stone work embankment and superstructure have also been practically completed. The work is being done by contract by Messrs. Pratt & McDougall, of Midland, Ontario, the contract price being \$39,700.

Spruce shoal (Parry Sound).—A reinforced concrete beacon is in course of construction on the southern extremity of Spruce shoal, at a point distant 150 feet from the southwest point of Spruce island. It consists of an octagonal cribwork foundation, $13\frac{1}{2}$ feet high, which was sunk in 17 feet water, on August 31, 1907. The superstructure will be of reinforced concrete and will be built to a height of 21 feet above the level of the water, and upon this will be erected a gas light with the necessary reservoirs. The work is being done by contract by Mr. Thos. A. White, of Parry Sound, the contract price being \$12,875.

McKay island.—A combined lighthouse tower and keeper's dwelling was erected on the eastern end of McKay island. It stands 60 feet back from the water's edge, and consists of a square wooden building, with a square wooden lantern rising from the middle of its hip roof, the whole painted white. It is 34 feet high from its base to the

879 EDWARD VII., A. 1909

top of the ventilator on the lantern. The work was done by day's labour under the foremanship of Mr. M. J. Egan, and cost \$2,051.89.

Point Porphyry.—A fog-alarm building to contain a 3-inch low pressure diaphone plant, was erected at this station, and is a rectangular framed wooden structure, built upon solid concrete foundations. The diaphone plant was provided by the Canadian Fog Signal Company, of Toronto, for \$7,250, and the plant is now being installed, and will be ready for operation by the middle of May, 1908. The work of erecting the building and installing the machinery is being done by day's labour, under the foremanship of Mr. Peter Tonge, and has cost to date, \$3,783.05.

Welcome island.—A wooden fog-alarm building, on concrete foundation, was erected at this station, to receive a 1½-inch diaphone plant, which was purchased from the Canadian Fog Signal Company, of Toronto, for \$2,500. The machinery will be installed in the spring of 1908, but the fog-alarm building was completed by day's labour, and cost \$2,273.74.

Warrens landing.—Two pairs of range lights were erected at the mouth of the Nelson river, at the north end of Lake Winnipeg. The lower range lights consist of two inclosed wooden towers, square in plan, with sloping sides, and are painted white. The front tower is erected on the southeast end of the island, opposite Warrens landing; it is 25 feet high from its base to the ventilator on the lantern, and shows a fixed white light elevated 32 feet above level of the water and visible eleven miles in the line of range. The back tower is situated a third of a mile from the front light, is 30 feet high from its base to the ventilator on the lantern, and shows a fixed white light elevated 38 feet above level of the water, and visible eleven miles in the line of range. The upper range lights consist of two inclosed wooden towers, square in plan, with sloping sides, and are painted white. The front tower is erected at Warrens landing, on the west side of the mouth of Nelson river; it is 31 feet high from its base to the ventilator on the lantern, and shows a fixed white light elevated 33 feet above level of lake and visible eleven miles in line of range. The back tower is 40 feet high from its base to ventilator on lantern, and shows a fixed white light, elevated 42 feet above level of lake and visible eleven miles in line of range. The towers were erected by day's labour, under the supervision of Mr. M. J. Egan of this department, and cost \$1,725.51.

IMPROVEMENTS TO EXISTING AIDS.

Ste. Anne de Bellevue.—The front light of Ste. Anne lock range, Ottawa river, is now shown from an anchor lens lantern hoisted on a mast, on the northeast pier of the canal. A white diamond-shaped slatwork day-mark is attached to the mast. The fixed white light is elevated 52 feet above high water mark. The back light of Ste. Anne lock range is now located on the bank of the canal at the Canadian Pacific Railway bridge, and is distant 415 feet from the front light. The light is shown from an anchor lens lantern hoisted on a white mast. A white diamond-shaped slatwork day-mark is attached to the mast. The fixed white light is elevated 72 feet above high water mark. The re-arrangements of these lights was done by day's labour, and cost \$90.68.

Graham wharf.—The characteristic of the range lights at Graham, Lake of Two Mountains, Ottawa river, will, on the opening of navigation in 1908, be changed from fixed red to fixed white. The back range pole has been made 14 feet higher. The pole is now 36 feet high; and the light, shown from a pressed lens lantern, is elevated 55 feet above the summer level of the river. The work was done by day's labour and cost \$62.74.

Oka.—Oka lighthouse, which formerly stood on a pier on Pointe du Lac, Lake of Two Mountains, Ottawa river, was moved three-eighths of a mile up stream. It now

SESSIONAL PAPER No. 21

stands on top of the hill, about 235 feet back from the shore, on the north side of the lake, one and a half miles above the wharf at the village of Oka. The fixed white light is elevated 144 feet above the summer level of the river, and is visible seven miles. The tower was moved by day's labour, under the supervision of Captain Weir, C.G.S. *Maisonneuve*, and the cost of removal was \$612.86.

Lower Narrows.—A lighthouse tower was erected on a pier on the south side of Allumette island, Ottawa river, at the first narrows above Pembroke (Lower Narrows). The old light pole and shed were removed and the light shown from the pole replaced by one shown from an inclosed square wooden tower, with sloping sides, surmounted by square wooden lantern, the whole painted white. The height of the tower from its base to the top of the ventilator on the lantern is 27 feet. The tower stands on a square concrete pier, with sloping sides, standing in the water immediately off the south point of the island at the narrows. The light is a fixed white light, elevated 25 feet above the summer level of the river, and visible six miles from all points of work was done by day's labour, under the foremanship of Mr. F. Castle, and cost \$1,502.75.

Pleasant point.—Repairs were executed to the tower and dwelling at this station. Concrete foundations were placed under the dwelling, and the flooring renewed. Repairs were also made to the tower and the boathouse put in good condition. The work was done by day's labour under the direction of Mr. M. J. Egan, and cost, \$790.99.

Port Colborne.—On November 1, 1907, the fog alarm maintained in the lighthouse on the outer end of the west breakwater, Port Colborne, was replaced by a more powerful fog alarm, installed in a new building erected on the west side of the lighthouse. The fog alarm consists of a diaphone, operated with air compressed by an oil engine, and gives one blast of $2\frac{1}{2}$ seconds' duration every minute. The fog alarm building is a rectangular reinforced concrete structure with an arched roof. The resonator, elevated 24 feet above the level of the lake, projects from the south side of the building. The building was erected by contract by Mr. M. J. Hogan, of Port Colborne, and the contract price, including extra concrete foundations, was \$4,900. The machinery was erected by day's labour at a cost of \$631.75.

The maintenance of the electric lights on the Grand Trunk Railway elevator, on the east bank of the Welland canal, Port Colborne, was discontinued, and they were replaced by a light shown from a new back range lighthouse tower, erected on the eastern side of the canal, 80 feet back from the water's edge, and 4,620 feet from the front range lighthouse on the outer end of the western breakwater. The tower is a galvanized steel skeleton structure, square in plan, with sloping sides, surmounted by a white wooden watchroom and a red octagonal iron lantern. The height of the tower from its base to the top of the ventilator on the lantern is 90 feet. The light is an occulting red light, visible for $4\frac{1}{2}$ seconds and eclipsed for $1\frac{1}{2}$ seconds alternately. It is elevated 97 feet above the level of the lake, and visible 10 miles from all points of approach by water. The illuminating apparatus is dioptric of the fourth order; and the illuminant petroleum vapour, burned under an incandescent mantle. The tower was supplied by Messrs. Goold, Shapley & Muir, of Brantford, Ont., for \$1,657.80, and the concrete foundations for the tower were built by day's labour at a cost of \$270.

Gull rock.—Repairs were made to the lighthouse tower, pier, dwelling and boathouse at this station, and the dwelling and outbuildings repainted. The work was done by day's labour, under the foremanship of Mr. T. H. Brewer, and cost \$1,615.58.

Chantry island.—Repairs were made to the front range lighthouse tower at this station, and a new summer kitchen and woodshed built. The work was done by day's labour, and cost \$466.90.

8-9 EDWARD VII., A. 1909

Mississagi strait.—The upper portion of the lighthouse tower was entirely renewed, and the dwelling repaired and repainted. The work was done by day's labour, under the foremanship of Mr. W. Fryer, and cost \$917.99.

Cape Croker.—A small dock for unloading coal, &c., was built, and also a well, lined with concrete. Some alterations were made to the machinery plant; the work being done by day's labour and costing \$798.30.

Lonely island.—The new lighthouse tower, keeper's dwelling and outbuildings, mentioned in last year's annual report as under construction, were completed, and also a new protection breakwater. The lighthouse tower is an octagonal wooden building, with sloping sides, painted white, surmounted by a circular iron lantern painted red. It is 57 feet high from its base to the vane on the lantern. The light is a flashing white light, showing three bright flashes of $\frac{1}{4}$ second duration each, separated by eclipses of one second, and followed by an eclipse of $4\frac{3}{4}$ seconds' duration, and is elevated 195 feet above the level of the lake, and visible 20 miles. The illuminating apparatus is dioptric of the third order, and the illuminant petroleum vapour burned under an incandescent mantle. The work was done by day's labour, under the foremanship of Mr. Wm. Fryer, and the cost to complete it was \$1,727.80

Mississagi island.—Repairs were made to the lantern deck of the lighthouse; the boathouse moved lakeward and repaired, and the lighthouse and outbuildings repainted. The work was done by day's labour, and the cost, \$806.55.

In addition to the above, minor repairs were executed at the following stations :

Burlington beach, temporary pole light.. . . .	\$ 162 20
Bronte, repairs to tower.. . . .	175 00
Collingwood, repairs to pier.. . . .	115 00
Cobourg, repairs to shed and boathouse.. . . .	228 89
Dorval, repairs to tower.. . . .	204 55
East Gap, repairs to fog alarm building.. . . .	44 10
False Ducks, piping changed.. . . .	54 68
Graham wharf, repairs to tower.. . . .	62 74
Limekiln crossing, temporary pole lights.. . . .	47 51
Long island, repairs to plank walk.. . . .	218 00
Nine Mile point, material for repairs.. . . .	211 41
Salmon point, repairs to tower and dwelling.. . . .	332 94
Stag island, temporary light.. . . .	41 79

LIGHTS DISCONTINUED.

Gibraltar point.—On June 30, 1907, the exhibition of a light from Gibraltar point lighthouse, located about $1\frac{2}{3}$ miles south of Toronto, was permanently discontinued.

Michael point.—The exhibition of a light from the lighthouse on Michael point, south side of Manitoulin island, was permanently discontinued.

Bois Blanc island.—The range lights, formerly maintained at the head of Bois Blanc island, were discontinued and the towers taken down.

Limekiln crossing.—The range lights marking the axis of the old channel through Limekiln crossing, abreast of Fort Malden, were permanently discontinued and the towers taken down.

Little Current.—The fixed red light heretofore maintained in the town of Little Current, has been extinguished.

SESSIONAL PAPER No. 21

BRITISH COLUMBIA.

NEW AIDS TO NAVIGATION.

Estevan.—A fog alarm building, to contain a 5-inch diaphone plant, was erected; as also a double dwelling for the engineers. In addition, the wireless telegraph station, mentioned in last year's annual report as under construction, was completed, and a trolley track $2\frac{1}{4}$ miles in length made from the landing place to the site of lighthouse tower for transportation of building materials, &c. The diaphone plant has not yet been installed, but will be shipped very shortly, and the tower erected during next season. The work is being done by day's labour, under the supervision of the Victoria agency, and the cost of construction, this year, has been \$19,959.85.

Cape Beale.—A fog alarm building was erected at this station. The diaphone plant and machinery were landed and are now being installed. The building is a rectangular wooden structure, on concrete foundation, and the diaphone plant was purchased from the Canadian Fog Signal Company, of Toronto, for \$7,250. The fog alarm building was erected and the machinery is being installed by day's labour, under the supervision of the Victoria agency, and the cost to date has been \$6,028.88.

Pachena point.—The lighthouse tower, fog alarm building and double dwelling, mentioned in last year's annual report as under construction, were completed, and the 5-inch diaphone plant installed. The fog alarm building is a square wooden structure, painted white with the roof red. It is 31 feet square and 13 feet in height, and is built upon a concrete foundation. The double dwelling is a framed wooden structure, 52 x 24 x 19 feet high, and is built upon solid concrete foundation. The lighthouse tower is an octagonal wooden building, with sloping sides, surmounted by an octagonal iron lantern, and is 38 feet 9 inches high from its base to top of wall plate. The tower is now ready to receive the lantern and illuminating apparatus, which will be erected during the coming season. The work was done by day's labour, under the supervision of the agency at Victoria, and the amount expended on this station this year was \$8,029.60.

West Coast Trails.—In consequence of the many disasters that have occurred along the west coast of Vancouver Island, a special appropriation was made in the departmental estimates of this year for the establishing and maintaining of life-saving stations, the improving of the existing telegraph trail, and the making of a pack-horse trail, to be constructed along the west shore of Vancouver Island, from Barkley sound towards Port San Juan. Work was begun on the trail on June 21, 1907, when a party consisting of three foremen and from fifty to sixty workmen, under the superintendence of Mr. John D. MacDonald, began road operations from the Banfield creek end. By November 30, when work was suspended for the year, about 22 miles of trail were completed beyond Pachena light station. The route followed was an extremely difficult one. Streams and gulches had to be bridged; the trail, where it ran through swamps and low-lying land, corduroyed and covered over with brushwood and gravel, to render it at all passable; cribwork built at numerous places to sustain the trail where it passed alongside hills; and many steep bluffs blasted as the only means of making a gradient that would not be too steep for horses to travel over. In the course of the 22 miles of completed trail, 20 bridges were built (varying in length from 20 to 200 feet); 60 culverts constructed, ditches dug along the side of the trail; and a large amount of corduroying done, in some cases to the extent of 200 yards continuously. Underbrush and fallen timber strewed the way. The trees often being of great size, necessitated cutting them into suitable lengths and splitting them with wedges before they could be moved out of the way. Next season the trail will be continued.

8-9 EDWARD VII., A. 1909

In connection with the life-saving station portion of the above-mentioned special appropriation, a life-boat station was established at Clo-oose; a boathouse and boat slip built at Ucluelet life-boat station, and a house, boat slip and kitchen annex built at Banfield creek life-boat station. The whole of the above work is being carried out by day's labour, under the supervision of the Victoria agency, and the amount expended this year, out of this vote has been \$34,518.42.

Ballenas islands.—The fog alarm building mentioned in last year's annual report as under construction was completed during the present year, a dwelling for the engineer erected, and a 1½-inch diaphone plant and machinery installed. The fog-alarm building is a rectangular wooden structure, and the keeper's dwelling is also a framed wooden building. The diaphone plant was supplied by the Canadian Fog Signal Company of Toronto, for \$1,900, and the buildings were completed and machinery erected by day's labour under the supervision of the Victoria agency, at a cost of \$5,340.03.

Sisters.—The fog alarm building mentioned in last year's annual report as under construction was completed this year, and the diaphone plant and machinery installed. The building is a rectangular wooden structure, and the 1½-inch diaphone plant was supplied by the Canadian Fog Signal Company of Toronto, for \$1,900. The building was completed and the machinery installed by day's labour, at a cost of \$2,664.94.

Yellow Island.—The fog alarm building mentioned in last year's annual report as under construction was completed this year, and the diaphone plant and machinery installed. The building is a rectangular wooden structure, and the 1½-inch diaphone plant was supplied by the Canadian Fog Signal Company of Toronto, for \$1,900. The building was completed and the machinery installed by day's labour, at a cost of \$3,347.68.

Gillard Island.—A gas-lighted beacon was established on the northeast extremity of Gillard island, Yuculta rapids, Cardero channel. The beacon consists of a steel cylindrical tank standing on a steel framework, and surmounted by a pyramidal steel frame supporting the lantern, the whole painted red. The light is a white light, automatically occulted at short intervals. It is elevated 28 feet above high water mark, and visible 2 miles from all points of approach by water. The illuminant is acetylene, generated automatically. The light is unwatched. The work was done by day's labour, under the supervision of the Victoria agency, and cost \$378.

Pine Island.—The diaphone plant and machinery purchased last year from the Canadian Fog Signal Company, of Toronto, was installed, and consists of diaphone, operated with air, compressed by an oil engine. The fog alarm building stands 200 feet northwest of the lighthouse, and is a rectangular wooden building, painted white with the roof red. A considerable amount of clearing was done around the station as a protection against fire; the work of installing the machinery and clearing the ground being done by day's labour at a cost of \$647.05.

Ivory Island.—The fog alarm building mentioned in last year's annual report as under construction was completed, and the diaphone plant and machinery installed. The building is a rectangular wooden structure, and the 1½-inch diaphone plant was supplied by the Canadian Fog Signal Company of Toronto, for \$1,900. The building was completed and the machinery installed by day's labour at a cost of \$3,441.65.

Gas-lighted Beacons.—Gas-lighted beacons were established at the following places :—(1) Pointers, Chatham Sound; (2) Ridley island, Prince Rupert; (3) Coast island, Prince Rupert; (4) Green Top island, Chatham sound; (5) Watson rock, Gibson island; (6) Morning reef, Klewnuggit; (7) Fog rocks, Fitzhugh sound. (8) Zero rock, Rivers inlet; (9) West rock, Strait of Georgia; (10) Joan point, Dodd

SESSIONAL PAPER No. 21

narrows; (11) Danger reef, Stuart channel; (12) Kelp reef, Haro channel; (13) Gabriola reef, Strait of Georgia; (14) Maud island, Seymour narrows. These beacons consist of steel cylindrical tanks, standing on steel framework, &c., surmounted by pyramidal steel frames supporting lanterns. The illuminant is acetylene, generated automatically and the lights are unwatched lights. No special account was kept of the actual cost of each of these beacons. The labour was performed by the crews of the C.G.S. *Quadra* and the hired steamer *Maude*, as opportunity offered, and took a longer or shorter time as governed by local conditions. The cost is, therefore, included in the payments made for the steamer *Maude* and in the wages of the crew of the *Quadra*, but the total cost of the materials used in the building of these beacons was \$1,300.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Lennard island.—A reservoir for increasing the water supply to the fog alarm was constructed, the work being done by day's labour for \$503.75.

Porlier pass.—Repairs were executed at this station, by day's labour, for \$170.80.

Sandheads lightship.—Repairs were executed to the lightship by day's labour, for \$919.42.

Entrance island.—Repairs were executed at this station by day's labour, for \$174.21.

Gallows point.—This gas-lighted beacon was entirely rebuilt, and the piles coppered, the work being done by day's labour, for \$308.33.

Egg island.—Machinery repairs were executed at this fog alarm station by day's labour, for 150.95.

APPENDIX No. 2.

ANNUAL REPORT OF THE COMMISSIONER OF LIGHTS' BRANCH.

To the Deputy Minister of Marine and Fisheries,
Ottawa, Canada.

SIR,—I have the honour to submit the fifth annual report of this branch.

The principal work carried out has been the substitution of modern dioptric apparatus in a number of the important coast lights and an extension of the gas buoy and beacon service through the various provinces, also the maintenance of lights and general aids to navigation throughout the Dominion.

In the Nova Scotia agency the base of operations has been changed from Dartmouth to the Imperial dockyard at Halifax, thus affording larger stores and yard area together with excellent berthing for the department's steamers. The steamers *Lady Laurier* and *Aberdeen* are available for lighthouse and buoy work, but as they have not been able to carry out all the work of the agency, the buoys on the Bay of Fundy coast of Nova Scotia from Cape Sable, inward, have been placed under the care of the New Brunswick agency.

In the New Brunswick agency, facilities in connection with the lighthouse and buoy service are entirely inadequate. There is but one steamer available in this agency and no dock accommodation except part of the ballast wharf which is owned by the railway. However, an amount has been placed in the estimates for the fiscal year 1908-9 towards acquiring wharf accommodation and the building of an additional steamer. Owing to the insufficiency of the *Lansdowne* to meet the needs of the service, it was necessary last year to charter a steamer from November, 1907 to March, 1908.

In the Prince Edward Island agency, the work of this branch has consisted chiefly in the maintenance and repairs to the lights and in the maintenance of the gas buoy service. The lighthouse tender, *C. G. S. Brant* has been utilized in delivering supplies and in inspection work, while the gas buoys have been placed by the *C. G. S. Stanley* and raised in the fall by the same steamer.

In the Quebec agency, the work left over from last year has been completed and new work undertaken together with the maintenance and repairs to the lights and the maintenance of the gas buoy service. The maintenance of the lights in the Montreal agency has been carried out by the Quebec agency for the reason that the facilities in connection with the Montreal agency have been inadequate for the carrying out of all the work in connection with that agency.

In the British Columbia agency, there has been considerable development. The *C. G. S. Quadra* is available for lighthouse and buoy work, but owing to the extensive coast line and the amount of work to be performed, it has been found necessary to charter the steamers *Maude*, *Cascade* and *William Jolliffe* for varying periods of time.

In the Parry Sound agency, the scow which was constructed at Prescott last year, has been in service and has given satisfaction. A contract has been let for a new lighthouse and buoy boat, and it is expected that this boat will be delivered in Canada in midwinter and will proceed to the Georgian Bay on the opening of navigation. It will then be possible to dispense with the services of a chartered boat in the Georgian Bay. The new berthing wharf at Parry Sound has been completed and is in service.

SESSIONAL PAPER No. 21

At the Dominion Lighthouse Depot, Prescott, no new structures have been erected with the exception of a boat-house in which to house the smaller boats attached to the division. The technical staff at the depot has been augmented and much work has been accomplished in the preparation of plans for lighthouse apparatus, which will in future, be made in Canada but, which has in the past, been purchased in Europe. The lighthouse depot, besides being used as a distributing point for various kinds of lighthouse apparatus and spare parts for gas buoys, has also been developed into a manufacturing centre of much usefulness. From Prescott depot also is administered the lighthouse and buoy service for the Montreal-Kingston division.

Below will be found a list of new lights erected in Canada during 1907-8 and various changes made in existing lights, thus increasing the efficiency of the service.

NOVA SCOTIA.

Amherst Front Light.—22-inch reflector, duplex burner, white.

Amherst Back Light.—22-inch reflector, duplex burner, white.

Fourchu Head.—360° 5th order French lens, duplex lamp, red.

Glace Bay, Front Light.—360° 6th order French lens, duplex lamp, red.

Glace Bay, Back Light.—20-inch reflector, duplex burner, red.

Guysboro' Harbour.—270° 5th order French lens, 25 mm. diamond vapour installation.

Island Harbour.—270° 6th order Chance lens, duplex lamp, occulting white.

McMillan's Point.—270° 5th order French lens, duplex lamp, white.

Moser Island.—270° 5th order French lens, 25 mm. diamond vapour installation, red.

Port Greville, Front Light.—180° Chance anchor lantern, duplex lamp, red.

Port Greville, Back Light.—270° 5th order French lens, duplex lamp, red.

Sable Island.—55 mm. Diamond vapour installation.

Sydney, Back Range Light.—180° 4th order holophote, French, 35 mm. vapour installation, white.

Bass River.—Dioptric 6th order.

Boars Head.—The light at this point has been changed from a revolving light to 5th order dioptric light.

Cape Fouchu.—A second order single flashing light has been put in operation.

Cole Harbour.—Catoptric light.

Grand Digue.—A new 25-foot tower fitted with a 6th order dioptric light, has taken the place of the pole light at this point.

Port Herbert.—Light has been changed from a catoptric to a 6th order dioptric.

Sable Island, East End.—A second order double flashing light has been put in operation.

Seal Island.—The new second order triple flashing light, which was being installed last year, has been put in operation.

NEW BRUNSWICK.

Cape Tormentine, Back Light.—360° 7th order Chance lens, duplex lamp, white.

Cocagne Range.—240° 6th order French lens, duplex lamp, red.

Little Belledune.—4th order complete lens, Chance, white 35 mm. Chance vapour light.

Shippegan.—35 mm. Chance vapour installation.

Swallowtail.—360° 4th order French lens, 35 mm. Chance vapour installation, occulting white.

Wilmot Bluff.—270° 5th order French lens, duplex lamp, white.

Anderson's Hollow.—7th order Chance anchor lantern.

Middle Island.—The catoptric lantern used at this station was replaced during the past year by a Chance anchor lens of the 7th order 240°.

Perry Point.—A new anchor lens lantern of the 7th order was installed, replacing the Mississippi lantern in use.

Richibucto Beacon Lights.—Owing to the changing of the channel in a more northerly direction, these lights were discontinued. A survey was made and range lights established, one on the north beach and the other on Chamberlain Point, at the northwest arm.

Sheldrake Island, Range Light.—The reflector lanterns at this station were replaced by lens lanterns of the 7th order.

Tracadie.—A new lamp with a 4th order lens replaced the 4 lamps and reflectors.

PRINCE EDWARD ISLAND.

Indian Point.—270° 4th order French lens, 35 mm. Chance vapour installation.

Panmure Island.—270° 4th order French lens, 35 mm. Chance vapour installation, white.

Fish Island.—55 mm. Chance vapour installation.

Souris East.—4th order double flashing light.

Warren Farm Range Lights.—Front light, a lantern with a red light shown from a 7th order lens. Back light, a lantern with a red light shown from a 7th order lens.

QUEBEC.

Cape Bauld.—55 mm. Chance installation.

Cape Brule.—270° 4th order French lens, 25 mm. Diamond vapour installation, white.

Cape Magdalen.—55 mm. Diamond vapour installation.

Cap aux Oies.—240° 4th order French lens, 25 mm. Diamond vapour installation, white.

Entry Island.—240° 4th order French lens, 35 mm. Diamond vapour installation, occulting white.

Gallia Bay, Upper Range, Front Light.—120° 7th order Chance lens, duplex lamp, white.

Gallia Bay, Upper Range, Back Light.—240° 7th order Chance lens duplex lamp, white.

Gallia Bay, Lower Range, Front Light.—120° 7th order Chance lens, duplex lamp, white.

Gallia Bay, Lower Range, Back Light.—240° 7th order Chance lens, duplex lamp, white.

Gascons Wharf.—360° Chance anchor lantern, duplex lamp, red.

Gentilly, Front Light.—180° 4th order holophote (French) 25 mm. Diamond burner, white.

Gentilly, Back Light.—180° 4th order holophote (French) 25 mm. Diamond burner, white.

Hospital Rock, Back Light.—27-inch reflector, 25 mm. Diamond vapour burner, white.

SESSIONAL PAPER No. 21

Hospital Rock, Front Light.—27-inch reflector, 25mm. Diamond vapour burner, white.

Ile du Pads, Front Light.—22-inch reflector and duplex burner, white.

Ile du Pads, Back Light.—22-inch reflector and duplex burner, white.

Ile du Moine, Back Light.—270° 5th order French lens, 2-wick capillary lamp, white.

Ile Perrot, Front Light.—Tubular lantern, mammoth burner No. 3, white.

Nicolet, Front Light.—22-inch reflector and duplex burner, white.

Nicolet, Back Light.—22-inch reflector and duplex burner, white.

Point-à-Basile, Back Light.—270° 5th order French lens, 2-wick capillary.

Point-à-Basile, Front Light.—270° 5th order French lens, 35 mm. Diamond vapour light, white.

Point du Lac, Back Light.—180° 4th order holophote (French) 25 mm. Diamond burner, white.

Point Roche.—Three Piper lanterns, No. 2 Piper burners, red.

Point St. Jean.—270° 4th order French lens, 25 mm. Diamond vapour installation, white.

Poste St. Martin, Front Light.—27-inch reflector, duplex burner, white.

St. Croix.—270° 4th order French lens, 25 mm. Diamond vapour installation, white.

Belle Isle, West End.—2nd order lantern and occulting light.

Cape Norman.—3rd order triple flashing light.

Carleton Wharf.—6th order dioptric.

Domaine Range.—Catoptric lights.

Fame Point.—1st order double flashing lights.

Magpie Bay Range.—Lanterns on poles.

Ste. Famille.—Catoptric lights.

St. Anne de Beaupre.—Catoptric lights.

Trois Pistoles.—Dioptric pressed lens.

Matane.—3rd order double flashing light.

ONTARIO.

Aylmer Island.—360 5th order French lens, duplex lamp, white.

Burlington, Front Light.—270 Chance anchor lantern, duplex lamp, white.

Burlington Bay, North Pier.—2-240° Chance anchor lanterns, duplex lamps, white.

Campbell Island.—360° 7th order Chance lens, duplex lamps, white.

Caron Point.—Prescott lamp, 240° 7th order Chance lens $\frac{1}{2}$ foot, flash burner, white.

Cobourg.—Piper headlight, red.

Cobourg.—Piper lantern, No. 2 Piper burner, red.

Eastern Gap, Toronto.—270 French lens, Diamond vapour installation, ruby.

Fort William.—240° Chance anchor lantern, duplex lamp, white.

Jackfish Bay.—Wingham lamp with 360° 6th order lens, 3-wick burner, white.

Little Current.—240° Chance anchor lantern, duplex lamp, red.

Little Currnet.—Piper headlight, No. 2 Piper burner, red.

Lower Allumette Lake.—240° Chance anchor lantern, duplex burner, white.

Lower Narrows.—270° 5th order French lens, duplex lamp, white.

McKay Island.—360° 6th order French lens, duplex lamp, white.

Oka.—4th order annular French lens, 2-wick capillary lamps, white.

Point aux Anglais.—4th order annular French lens 2-wick capillary lamp, white.

Point Edward, Back Light.—27-inch reector, duplex burner, red.

Presqu'Ile.—240° 4th order, French lens, 35 mm. Diamond vapour installation, white.

Richard's Landing.—240° Chance anchor lantern, white.

Rigaud.—3 Piper lanterns, No. 2 Piper burners, white.

Rigaud River.—2 Piper lanterns, No. 2 Piper burners, white.

Rosseau.—360° 7th order Chance anchor lantern, duplex lamp, red.

St. Anne de Bellevue.—4-240 anchor lanterns, duplex lamps, white.

St. Placide, Back Light.—24-inch reflector, duplex burner, white.

South Baymouth.—20-inch reflector, duplex burner, white.

Southampton, Front Light.—360° 5th order French lens, duplex lamp, red.

Southampton, Back Light.—24-inch reflector, duplex lamp, white.

Stag Island.—Piper headlight, No. 2 Piper burner, white.

Trenton.—240° Chance anchor lantern, duplex lamp, red.

Wolf Island.—270° 5th order French lens, acetylene, white, $\frac{1}{4}$ -ft. four-flame burner.

BRITISH COLUMBIA.

Cape Mudge.—270° 5th order French lens, 25 mm. Diamond vapour installation, white.

GAS BUOY SERVICE.

The gas buoys in the Dominion have given excellent service, but there have been two losses to report, namely—a No. 11 gas and whistling buoy broke from her moorings at Lockport, N.S., and has not been recovered, and one No. 11 gas whistling buoy from Swiftshore Bank, British Columbia.

There are also two other minor casualties to report, namely, (1) No. 11 gas and whistling buoy stationed at Sambro, N.S., broke the moorings and drifted ashore at Sable Island. This buoy will be brought to Halifax by the C. G. S. *Lady Laurier*... (2) A No. 11 gas and whistling buoy stationed at Cerebrus was carried away by the drift ice, this station being at the entrance to the Strait of Canso. The buoy is now ashore at Dover Bay, and will be taken to Halifax at the first opportunity.

The following statement shows the number of gas buoys in service in the Dominion:—

Districts.	Type.						No. in Service.
	5 & 6.	7 & 8½.	9 & 9½.	11.	14.	C*.	
Nova Scotia.....		7	4	18	2		31
New Brunswick.....	3	9	1	3			16
Prince Edward Island.....			4				4
Quebec.....		20				9	29
Ship Channel.....		1				47	54
Montreal-Trenton.....	9	33					42
Above Trenton.....		1					7
Georgian Bay.....		5		3			8
Lake Superior.....	3	3					6
British Columbia.....		7	7	2			16
	15	98	16	26	2	56	213

* Compressed gas.

The following gas beacons have been placed in service in British Columbia since the last report, viz:—

- Dock Island.
- Helen Point, Active Pass, Mayne Island.
- Walker Rock.
- Coffin Island.
- Sechelts (White Rock).
- Gallows Point, Nanaimo Harbour.
- Lund, South Ragged Harbour.
- Chatham Point.

Making a total of twenty-five gas beacons in service in this district.

Number of light-stations, lights, fog alarms and warning buoys in the Dominion:—

	Light stations.	Fog alarm stations.	Lights.	Lightships.	Lightboats.	Keepers.	Diaphones.	Sirens.	Fog horns and trumpets.	Fog bells.	Hand fog horns.	Hand fog bells.	Gas buoys.	Gas beacons.	Whistling buoys.	Bell buoys.	Submarine bells.	Fog whistles.	Fog guns or bombs.
Nova Scotia.....	240	2	261	2	..	246	9	..	2	5	39	1	31	..	12	30	4	7	1
New Brunswick.....	112	4	138	1	1	118	5	..	3	4	19	1	16	..	2	12	1	2	..
Prince Edward Island...	49	..	72	..	..	48	..	..	1	..	..	..	4	..	3	1	..	..	..
Quebec.....	234	1	284	5	1	232	15	1	3	..	12	2	84	..	1	1	4	3	6
Above Montreal and Ontario.....	237	..	315	2	..	198	13	2	5	3	37	..	62	1	..	4	..	..	..
Manitoba.....	7	..	10	..	..	7	..	..	..	..	..	..	..	..	..	..	..	..	..
British Columbia.....	78	1	82	1	..	65	9	..	5	7	4	..	16	25	2	4	..	1	..
	957	8	1,162	11	2	914	51	3	24	19	111	3	213	25	20	52	9	13	7

Besides the above mentioned lights, there are in the Dominion lights under private control, as follows:—

Nova Scotia.....	2
New Brunswick.....	1
Quebec.....	3
Ontario.....	45
British Columbia.....	4
Total.....	55

SUBMARINE BELLS.

Submarine bells are of three kinds: Those operated by electricity from shore stations; those operated by compressed air from lightships and those operated by the action of the waves on gas buoys.

In the case of electric submarine bells, the bell is affixed to a steel tripod some twenty feet high and the tripod is then placed on the bottom of the sea at a selected point to indicate the fairway into a harbour. On the shore is a small power-house with duplicate sets of oil engines and dynamos, and the bell is connected to the shore station by a submarine cable. In connection with these bells a controlling device is used by which it is possible to ring a distinct signal.

Four electric submarine bell signals are in operation, one at each of the following points: Negro Head, N.B., Yarmouth, N.S., Halifax, N.S., and Louisbourg, N.S. All four stations have given excellent results.

In the case of submarine bells operated from lightships, the bell is hung over the side in thick weather and operated by compressed air. These bells also have a controlling device which rings a distinct signal.

Five lightships are fitted with submarine bells, viz. the lightships *Red Island*, *White Island*, *Prince Shoal*, *Anticosti* and *Lurcher*. These bells also have given entire satisfaction.

The third variety of submarine bell, that operated by the action of the waves, is affixed to a floating buoy. The vertical motion of the buoy due to the action of the waves, in connection with a suitable mechanism, causes a spring to be compressed and when the compression reaches the desired point the spring is released and causes the hammer to which it is connected to impinge on the bell. In this type of bell a distinct signal has not yet been devised and the frequency of the blow depends on the activity of the wave motion. These bells operated by the action of the waves are now under test by the department and are not yet accepted as standard aids to navigation.

I desire to record and express my appreciation of the able assistance rendered by my staff and the untiring application to duty exhibited by each member. It would not have been possible to carry out the large and increasing amount of work which is devolving upon this branch without the co-operation of all the officers connected with it.

I have the honour to be, sir,

Your obedient servant,

J. G. MACPHAIL,

Acting Commissioner of Lights.

OTTAWA, March 31, 1908.

APPENDIX No. 3.

RIVER ST. LAWRENCE SHIP CHANNEL.

OTTAWA, Ont., July 9, 1908.

SIR,—I have the honour to present the following annual report on the operations for the improvement of the River St. Lawrence ship channel, during the fiscal year ended March 31, 1908.

The design and supervision of the improvements to the channel were continued, under the direction of the department, by the superintending engineer, including weekly personal inspections.

The direct superintendence of the operations and of the plant, was ably carried out by Mr. V. W. Forneret, B.A.Sc., assistant engineer, whose report in full is herewith appended.

In the interest of improvements to navigation, and the exchange of policy and information, the representatives of the various shipping and commercial corporations and foreign representatives, frequently accompanied by the minister and deputy minister of the department, made inspections of the river and works, which have proved of value both to the interests concerned and to the department.

The accidents on the river for the year were fortunately of very slight nature. The usual assistance was given by the vessels and plant of the department.

In order to give mail communication with distant points on the north shore of the St. Lawrence, two trips were made by the C.G.S. *Lady Grey* during the winter, from Quebec to Seven Islands.

The latter part of the winter of 1907-08 having been very severe, the upper parts of the St. Lawrence were completely and compactly frozen with very heavy ice. The Cap Rouge ice bridge did not take, owing to the fact that the 'battures,' once frozen, remained firm and did not, as usual, float down and jam in the narrows. In the spring, however, the ice remained firm from Batiscan to Sorel, later than usual. The work of the *Lady Grey* in breaking this was most successful. A full report of this work is given by Mr. N. B. McLean, assistant engineer.

The staff, including Mr. Forneret, in charge of the dredging operations, Mr. McLean in charge of surveys and sweeping, Mr. Albert Beauchemin in local charge of the dredging below Quebec, and Mr. M. C. Blais, employment officer at Sorel, as well as the assistants, gave every satisfaction.

The captains, engineers and crews of the dredges, tugs and other vessels deserve praise for the faithful discharge of trying and, frequently, difficult duties. It is probable that nowhere in the world of great operations can a more skilled staff and organization be found, and the department is to be congratulated on their excellent behaviour.

I have the honour to be, sir, yours obediently,

F. W. COWIE.

Superintending Engineer.

Lt.-Col. F. GOURDEAU,
Deputy Minister Marine and Fisheries,
Ottawa, Ont.

HISTORY OF THE SHIP CHANNEL.

The St. Lawrence, owing to its situation, is the natural route from the Atlantic to the northern and northwestern half of the North American Continent.

The opening of the Lachine canal, connecting Montreal with the Great Lakes in 1825, established the route commercially.

The light draught sailing vessels could then reach Montreal without trouble, except during a few weeks in the autumn when they resorted to lightering.

In 1844 it was in an effort to give navigation up to Montreal for vessels of 500 tons, that the first work of dredging was undertaken.

The first proposals for improvements were discussed in 1825, the national character of the work being then recognized. Surveys were made and reported upon in 1831 and again in 1838.

In 1841, during an investigation, the committee proposed a tonnage duty sufficient to provide for the cost of the improved channel, which it was considered would be less than that of lighterage. It was, however, agreed that "in order to draw the produce of the west down the St. Lawrence, it was expedient to make the transit charges as light as possible."

Operations were commenced by the "Board of Works" in 1844, and continued until 1847, when owing to opposition as to the location of the channel the work was abandoned. This work was in Lake St. Peter, in what was known as the Straight Channel. After 60 years, it is now considered that the straight channel as commenced, would have been preferable in many ways.

In 1850 the Harbour Commissioners of Montreal proposed that they could do the work more economically and expeditiously. They asked for authority to undertake the work and to charge a tonnage duty to pay for the 8 per cent interest and 2 per cent sinking fund.

This plan was adopted in August, 1850, and the commissioners were authorized to proceed in such a manner as they should deem best, the government plant being transferred to them.

The Harbour Commissioners, after examination and the best advice obtainable, adopted the location of the deepest natural channel in Lake St. Peter. This results in the present channel with five tangents, instead of two long straight courses as at first commenced.

The original depth through Lake St. Peter was 10 ft. 6 inches.

From 1850, the channel was deepened from stage to stage until in 1888, when the debt amounted to somewhat over three million dollars, the government decided to complete the channel as a national work, and to assume the debt, and from that day the channel has been open free to the commerce of the world.

At that date the channel had been deepened to 27½ ft., at ordinary low water from Montreal to Cap à la Roche, and from there to Quebec the tide was available.

Nearly 20,000,000 cubic yards had been dredged at an average cost of about 20 cents per yard, including the cost of the plant.

A dredge of the type of 1846, excavated in Lake St. Peter, in one day 1,200 cubic yards. By wonderful improvements, in 1888 the dredge of that time could make 7,200 yards without trouble. At the present time, working day and night, the Lake St. Peter dredge removes at a fairly average rate 20,000 cubic yards per day.

The work was conducted by the Department of Public Works of Canada from 1889 until 1904, when the management and control of the river together with the

SESSIONAL PAPER No. 21

shops and dredges, were handed over to the Department of Marine and Fisheries, which department had general charge of navigation.

At the present time a splendid channel of 30 feet at extreme low water exists from Montreal to Cap à la Roche, and to Quebec, by taking advantage of the tide.

The success of the work is in a great measure due to the geographical situation of the route, the physical features of the river favourable for improvement, the determination and public spirit of the business men and industrial corporations of Montreal, and to the recognition by the government of Canada, of the national character of the project.

PROGRESS OF THE OPERATIONS.

From 1850 to 1888 the work was conducted by the Harbour Commissioners of Montreal.

The first dredging plant was designed and engined on the Clyde in 1840.

It is interesting to note that in 1906 the designs for the latest dredge for the Clyde were made by Mr. John Kennedy, C.E., then chief engineer of the Montreal Harbour Commissioners.

The St. Lawrence dredging operations have always been conducted departmentally. The extent and continuity of the work have resulted in a staff, and an organization of men and plant, which is one of the subjects of interest in the commercial and engineering circles of the world. The engineers who have been connected with the St. Lawrence ship channel comprise the best known men in the profession in Canada.

The names of Bayfield, Gzowski, Keefer, Forsyth, Nish and Kennedy, who were the chief engineers at various times between 1840 and 1888, will go a long way to explain the success of the efforts for obtaining the improvements as planned by the government and the commissioners.

The Superintendents Vaughan, Bell, Armstrong, McKenzie and Howden have from time to time improved methods and plant, until the operations on the St. Lawrence are considered examples for other and older ports.

The rule has been to thoroughly understand the conditions and requirements and then to design dredging machines for the special work they are expected to perform.

The St. Lawrence dredging plant comprises a wide range of types :—

Two elevator dredges for soft clay.

Four elevator dredges for hard pan and shale rock.

One hydraulic dredge for soft mud, discharged by pipe.

One sand pump hopper sea-going dredge.

One hydraulic hopper sea-going dredge.

In every case these machines are actually doing their work as well or better than it could be dredged by any other existing type in the world.

With the staff for designing the channel and a plant specially suitable for the work proposed, the next consideration is the organization for keeping the machines constantly at work.

The St. Lawrence dredges work for seven months each season. They have then five months in winter quarters. The object of the working staff is to keep the dredge going as constantly as possible during the seven-months season. Owing to the very hard character of the material, and the necessity of not interrupting traffic, breakages and stoppages are frequent. The endeavour is, however, to keep as near to 70 per cent of the full working time as possible.

The working hours, with double crews, are 132 hours per week, i.e., from midnight on Sunday, without stops for meals, until noon on Saturday. The men were glad to work during 12 hours on condition of their receiving about 10 per cent increase of wages.

8-9 EDWARD VII., A. 1909

The crews of the dredges, tugs, barges, &c., are almost exclusively French Canadians, born and brought up on the banks of the St. Lawrence near Sorel. For skill, patience, sobriety and fitness for the work, it would be quite impossible to find their equal.

Most of them make it their life work. They are trained to every phase of operating a dredge to the limit of its strength, to being resourceful and to quickly making repairs.

By order from the minister conducting the department, owing to the faithful discharge of continuous duties, the men are taken to Sorel every second Sunday.

The repair and construction shipyard and shops at Sorel also add very materially to the success. The rule is to drive the machinery to its limit, to expect breakdowns and to have spares or the equipment for speedy repairs.

The strain on the men and machinery working day and night is very great. At the end of seven months a rest is inevitable.

The whole work being in the interests of navigation, the channel is periodically examined and swept, to be sure that there are no obstructions. The depth of water is given daily. In the first part of the season, the depth of the 30-foot channel ranges from 36 to 32 feet. It lowers in September and usually the lowest stage is reached in October. The highest in 1907 was 38 feet 3 inches and the lowest 31 feet 10 ins.

The engineering staff has summer headquarters on the work. The superintending engineer, the chief assistant, the sweeping engineer, and the superintendent live aboard steamers or tugs and are always on the work, the hours being 'all-the-time'; and with excellent results.

In the long experience of design and usage, the machinery has been brought to a state of perfection and strength, that shale rock merging into soft limestone is dredged, at a speed and cheapness most extraordinary.

As a government organization the ship channel is well known as being able to compete in every way with operations by contract. This is due to the fact that an efficient staff, good men, and the best plant are provided.

The aims which have resulted in marked success are briefly as follows : —

1. To keep the plant up to the best standard of design and suitability for the work.

2. To provide first-class officers and crews.

3. To design the improvements with careful consideration.

4. To keep down costs by a thorough system of comparative statistics.

5. To keep up the quality by a regular and systematic inspection.

6. As a public work to keep the confidence of the public by consultation with those who are interested, and make use of the improvements.

THE PRESENT PROJECT.

The present project for a 30 foot channel between Montreal and Quebec, was adopted in 1889, while the improvements below Quebec were decided upon in 1906.

The estimate of 1899, was for 10 years work. The plant was only partially available until 1903.

The project for the channel between Montreal and Quebec had in view a channel of 30 feet depth, at the extreme low water of 1897, from Montreal to tide water at Batiscan, and from Batiscan to Quebec at extreme low tide. The width contemplated was a minimum of 450 feet in the straight portions, and from 550 to 750 feet at the bends. An anchorage was to be provided for Lake St. Peter.

Of this work, the 30 foot channel from Montreal to tide water at Batiscan, was completed in 1906. This is now in use, deep draught vessels in the autumn waiting for tide, to pass Cap à la Roche and St. Augustin bar.

The work remaining to be done is about 2½ miles of shale rock dredging at Cap a

SESSIONAL PAPER No. 21

la Roche; about 1 mile at Grondines; about 1 mile at St. Augustin bar, and also about 1 mile of widening at Ste. Croix, and $9\frac{1}{2}$ miles of widening in Lake St. Peter.

Cap à la Roche will probably take from 3 to 4 years to complete, while the remainder to Quebec should be completed at the same time or in one year longer.

The widening of Lake St. Peter it is expected will be done in 1909.

The project of work below Quebec, had in view a 30 foot channel at low tide at the St. Thomas Flats, and at Beaujeu Bank everywhere, 1,000 feet wide.

The Beaujeu Bank will be completed in 1908.

The St. Thomas Flats, where the material is clay and sand, and covering nearly 4 miles of channel, should be finished in 1909, or early in 1910.

This channel, however, is limited to a depth of 30 feet at low tide by the St. Roch Traverse. Dredging here is out of the question.

For a greater depth than 30 feet at low tide, the North Channel from St. Jean, Ile d'Orleans, past Cap Tourment and north of Ile aux Coudres, must be undertaken.

This channel has every advantage over the South Channel except that it would take longer to complete, and there is some question of the sand shoals at the North Traverse filling in.

The advantages are the fact of the short length requiring improvement and the splendid navigability of the remainder. It avoids the St. Roch Traverse and the narrow waters from the Pillars to Bellechase. A depth of 35 feet could be obtained with comparative ease.

The question of the adoption of this route as soon as the South Channel is made 30 feet, will require almost immediate consideration.

THE PLANS FOR THE FUTURE.

The completion of the 30 foot project being in sight, it is not too soon to look forward to the next step.

The 30 foot channel was designed and laid out so as to be easy of navigation for the largest ships that could pass with the available depth. The widths and curves were designed for a much greater available depth than 30 feet.

A new depth may therefore be commenced without changing the lines of the channel, or the aids to navigation.

With the ship channel dredges a face of 4 feet is preferable as being a full economical cut. As, however, 35 feet would give easy navigation to the largest present New York steamships, it has been considered the best proposal for the next project.

The plant available at present for between Montreal and Quebec, consists of six elevator dredges, one hydraulic dredge, one stone-lifter and a complement of tugs, scows, &c.

For below Quebec there are two splendid sea-going hopper dredges.

For the upper reach one large size spoon dredge is under construction. A steel hull elevator dredge, capable of dredging to a greater depth is authorized, as well as a new stone-lifter.

In my opinion, at least two of the present elevator dredges having wooden hulls, will not last many more years and they should be reduced by one new one, each year. They take about two years to build.

Two or three additional tugs and several scows will also be required.

The plant for below Quebec is in every way suitable for the work, except that a larger tug, if possible the *Eureka*, should be connected with it.

With two or three new elevator dredges, the same number of tugs, one stone-lifter and the necessary scows, the ship channel plant will be ample to undertake the 35 foot channel and complete it between Montreal and tide water in six seasons.

The present progress is excellent; the plant is unique in fitness and economy, and the extent and importance of the operations would be considered remarkable anywhere in the world.

8-9 EDWARD VII., A. 1909

From 1889 to 1899, in 10 years, the expenditure averaged \$130,000 per annum, and the dredging 350,000 cubic yards.

From 1899 to 1904, during the five years, the average expenditure was \$515,000 and the excavations 3,500,000 cubic yards annually.

From 1904 to 1907, in four years, the expenditure amounted to \$530,000 per annum, and the quantity dredged 3,700,000 cubic yards.

During the fiscal year 1907-1908, the expenditure on dredging plant and dredging amounted to \$657,548.44, and the quantity removed 4,831,875 cubic yards, showing a steady and satisfactory progress.

ROCK DREDGING.

The most important and difficult section of the ship channel is at Cap à la Roche and Cap Charles, where the material to be dredged is principally solid shale rock of various degrees of hardness but mostly of about the hardness of a soft school slate. It is an outcropping from hard-pan, and the whole bottom is covered with boulders of all sizes up to 30 or 40 tons in weight, which necessitates the frequent employment of stone lifters to remove them out of the way of the dredges.

The total amount of rock to be dredged is 2.90 miles or 1,700,000 cubic yards.

The question as to the best method of doing this work economically and quickly has been given much consideration and investigation. The rock being sufficiently soft to be within the cutting power of dredge teeth, it is quicker and cheaper to take out the rock by dredging alone than either by blasting and dredging or breaking by a chisel boat and dredging.

There would be disadvantages in working a blasting boat in the tidal waters and strong currents at Cap à la Roche and Cap Charles, as it would be necessary to frequently move out of position and lose unfinished drilled holes, in order to allow vessels to pass.

As to the kind of dredging plant which is most suitable for the work, this is a very important question, and it is an opinion that the best plant for these places would be very powerful dipper dredges for tearing out the rock to grade line, and elevator dredges for cleaning and finishing the bottom to the full depth required.

Dipper dredges can take out the bulk of the rock more cheaply than elevator dredges, and a powerful one of this type is being constructed at the Sorel shipyard for this purpose. Dipper dredges, however, lose considerable time in making a clean bottom, and this part of the work could be done with more economy by elevator dredges such as those which are now in use on the ship channel.

The holding of the dredges at Cap à la Roche and Cap Charles, is quite a problem.

Anchors cannot be used, as owing to the smooth rock bottom the flukes do not embed themselves sufficiently to hold.

The method adopted, which has proved successful, is to drill a hole in the rock at the bottom of the river from four to five feet in depth in which a steel eye-bolt three inches in diameter (Lewis) is wedged very securely. To this Lewis is fastened a length of 1½-inch chain. The bow wire of the dredge is then attached to the end of the chain, and by this means the vessel is held.

Other difficulties to contend with in this tidal part of the river, are the very strong current, and frequent storms accompanied by heavy seas especially during easterly gales.

Great care is taken in disposing of the excavated material to the best advantage so as to prevent local lowering of the water level.

The excavated material is dumped as nearly as possible opposite to the cut and a short distance away, in such a manner that the cross section area of the river remains practically the same.

When dredging, every precaution has to be taken to prevent the channel from being obstructed. A very sharp look-out is kept, for steamers day and night, especially since night navigation commenced.

SESSIONAL PAPER No. 21

The dredges work radially from one side of the channel to the other by means of chains fastened to side anchors, which are placed on the banks, two on either side. These chains are worked by steam winches.

When a steamer is in sight, the dredge has to give herself sufficient time to be able to move to one side of the channel to give a clear passage.

Very great care is taken to see that the winches are always kept in good order and handled by expert men, as their failure to work at any time would be a serious matter, and might mean the blocking of the channel.

PERMANENCE OF THE CHANNEL.

It is a frequent statement that no river in the world is better adapted for improvement than the St. Lawrence. The channel once dredged, owing to the stable character of the river bed, and the clean water, remains permanent.

The dredging of a channel consisting of the displacement, only, of the material from where dredged to a point opposite, does not lower the water level. In fact for the past few years, great care is taken with regard to the position of the dumps, so as to actually raise the water in places and to make the current straighter and more uniform.

Questions have lately arisen, however, of the diversion of part of the supply of water, and the regulation of its flow.

Any scheme which has in view the diversion of any water which should come to the St. Lawrence, or any proposal which might curtail the flow during the low water period, should be absolutely opposed, as being vital to the security of the St. Lawrence Ship Channel and Montreal Harbour.

Another question which is forcing itself to our notice is the protection of the banks of the river. The sand banks at several points, covering the clay low water beaches, have given way much more than formerly. Whether this is due to the high speed of the ships and Richelieu steamers or not, the protection of the banks at Longue Pointe, Sorel, Three Rivers and Champlain, will require immediate attention.

THE CAPACITY OF THE CHANNEL FOR NAVIGATION.

The contracted part of the River St. Lawrence, from the sea to Montreal, the ship channel is from the St. Roch Traverse to Montreal a distance of 220 statute miles.

The length of channel actually requiring improvement covers a length of about seventy miles.

The length completed, to 30 feet at extreme low water, at the close of the fiscal year, was fifty-nine miles, leaving eleven miles to dredge, so as to make the 30 feet available at all stages of the tide.

It was the object of the first dredging, to enable sailing ships of 500 tons to pass through Lake St. Peter to Montreal.

With the present available depth of 30 feet at the lowest stages of river level, and more, during the first half of the season, ships of 15,000 tons may freely navigate.

With an addition of 5 feet in depth, the largest ships afloat could, if necessary, reach Montreal.

The time occupied by the large ships, between Montreal and Quebec, is surprisingly short.

The Allan turbiner, *Virginian*, holds the record for the upward passage in 9 hours 37 minutes, while the Dominion liner *Ottawa* won by 8 minutes the downward passage in 8 hours 2 minutes.

The passenger and freight type of ship usually makes the upward trip in between 11 and 12 hours, and the downward trip in 2 hours less.

The fast passages are not encouraged as the waves have too much erosive effect on the banks.

8-9 EDWARD VII., A. 1909

As in the case of almost all navigable rivers, abroad, ships have to wait for the tide, the ship channel makes a very fair comparison in time of passage. The improvements necessary to make the St. Lawrence available for the largest ships afloat, are probably less than for the Thames, the Scheldt or the Elbe.

THE ST. LAWRENCE ROUTE.

As Winnipeg is the gateway to the great producing areas of the Northwest, so is the St. Lawrence the Canadian portal to the world's markets.

The line of route is not only the most direct, but owing to the long stretches of inland navigable waters, it is the cheapest.

Inland vessels and the northern continental railways, in their race to the sea, reach ocean navigation first at Montreal. With the present St. Lawrence canals, the present railways, the existing facilities at Montreal, and the 30 foot ship channel to the sea, the Canadian national route can hold its own with its only dangerous rival, the Buffalo-New York route.

What will happen when the two new transcontinental railways now under construction are completed, when the Georgian Bay or improved St. Lawrence canals are ready for traffic, when ample accommodation is given in Montreal Harbour, and when the ship channel has a depth of 35 feet, one can conjecture with satisfaction.

Apart from these, the only remaining requirement to place the Canadian route in a position beyond competition, both summer and winter, is a satisfactory winter port, with a railway distance from Montreal comparable in length with the Buffalo-New York lines.

Lord Durham's statement in 1837, to the effect that the State of New York had created her own St. Lawrence, from Buffalo via Albany down the Hudson to the sea board at New York, and captured the trade which Canada had lost by neglect to improve her waterways, bids fair to be comparatively reversed in the near future.

The thirty-five foot channel was commenced in November, 1907. The real beginning will not take place until the Cap à la Roche channel is completed for low tide. In the meantime, rather than lay up the dredges, they can work to advantage near Sorel from Nov. 15th until the actual advance of winter.

C.G.S. 'LADY GREY.

The Canadian Government steamer *Lady Grey*, has proved herself a very useful and powerful boat for towing purposes. Being a twin screw steamer she is easily handled and on account of her great engine power she is capable of undertaking very heavy tows successfully.

During the early part of last season the Department of Public Works made arrangements with the Department of Marine and Fisheries for the loan of the steamer *Lady Grey* to tow their large new dredge *Northumberland* from Quebec to La Have, N.S., a distance of 940 nautical miles.

On June 24, 1907, the *Lady Grey*, with her dredge *Northumberland* in tow, left Quebec for La Have.

The dredge was very low in the water having only about 2½ feet of free-board. She was helpless at sea on account of being unable to use her anchors.

When abeam of Kamouraska the wind became very fresh from the east and the appearance of bad weather coming made it advisable to stop for shelter.

The *Lady Grey* dropped her anchor, and the dredge was obliged to hang on to the tow-line.

While shortening the tow-line, the slack which had got foul of a boulder and become very taut, suddenly cleared and struck the second mate, Mr. J. Charbonneau, and killed him. This man had been warned to keep away from the hawser, but unfortunately did not pay any attention. The *Lady Grey* returned to Rivière du

SESSIONAL PAPER No. 21

Loup and landed the remains. An inquest was held, the verdict being 'accidental death.'

The tow left again on June 27th and stopped at Charlottetown, P.E.I., on July 1st, for coal, leaving again on the 3rd.

Between Charlottetown and Halifax the tow was greatly retarded on account of fog, and only reached Halifax on July 9, leaving on the next day for La Have where it arrived safely at noon, having been 17 days on the voyage.

After placing the *Northumberland* in a safe place the *Lady Grey* returned to Quebec, where she arrived on July 13, having also been delayed by fog on the return trip.

Had the Department of Public Works been obliged to charter a tug to do this work, the cost would have amounted to at least \$10,000.

The *Lady Grey* has had a sweeping apparatus installed on board for work in the ship channel, particularly below Quebec.

This steamer is also fitted out with two 12-inch salvage pumps for wrecking purposes, the capacity of each being 2,500 gallons per minute.

Last season during October and November, the *Lady Grey* was obliged to 'stand-by' for aid, for 25 days during the absence of the wrecking tug *Lord Strathcona* which had left on a towing trip in connection with the two C.P.R. steamers *Kewatin* and *Assiniboia* which had been cut in two parts and sent to Buffalo, N.Y.

On October 30, the *Lady Grey* received orders to proceed to Curve No. 2, Lake St. Peter, to give assistance in pulling off the C.P.R. steamship *Montreal* which had grounded there during the previous night. She left immediately and rendered very valuable assistance with her powerful pumps.

After the cargo had been partially lightered this steamer was easily pulled off, and she proceeded to Montreal to discharge her cargo.

This was the only accident of importance which took place in the ship channel during the season of 1907.

At the close of the season the *Lady Grey* had to be available to assist out-going steamers needing her services.

ACCIDENTS IN THE ST. LAWRENCE.

Only one accident of importance took place in the ship channel during 1907.

This occurred on October 29 at a point in Lake-St. Peter where the channel was 600 feet wide. The C.P.R. steamship *Montreal* grounded between the light pier and the edge of the dredged bank. The cargo had to a large extent to be lightered before the vessel could be floated. The contact with the concrete pier having damaged the hull, the ship had to be docked.

The accident occurred just before dark, the pilot, Lyderic Bouillé, stating that the ship took a sheer.

The minor accidents were as follows :—

May 10, 1907. Montreal Harbour—

S.S. *Concordia*, Windmill Point Basin.

Steel angles dropped to floor and went through bottom. After holes were wedged, the ship was able to sail.

June 19, 1907. Montreal Harbour—

SS. *Crown of Aragon* ashore at Maisonneuve. Anchored in fog. Wind carried her aground. Two harbour tugs pulled her off in 15 minutes. No damage.

July 2, 1907. Red Island—

S.S. *Montrose* aground at Red Island, in fog. Got off with flood tide. No damage.

July 2, 1907. Montreal Harbour—

Wooden steam barge, *Havana*, Pittsburg & Erie Coal Co., loaded with light rossed pulpwood.

8-9 EDWARD VII., A. 1909

R. & O. Str. *Prescott* in Lock No. 1, Lachine canal. *Prescott* reported to have rammed gate, letting in water which drove her back on *Havana*, damaging bow of barge and stern of *Prescott*.

Sincennes-McNaughton tugs took charge of both vessels. *Prescott* not badly damaged. Barge *Havana* sank at end of Bickerdike pier, not badly damaged.

August 23, 1907. Montreal Harbour—

Brick barge *Germaine* at wharf. Sunk by Str. *Imperial*. Rudder and engine room telegraph failed.

August 29, 1907. Quebec bridge disaster—

5.30 p.m. Thursday About 70 lives lost.

November 21, 1907—

C.G.S. *Montcalm* grounded at Cape Whittle, Pointe au Maurier. Floated same evening, making water. Wrecking steamer sent to her assistance and to accompany her to Quebec. They came up together to Quebec, and *Montcalm* went into dry dock for repairs.

November 28, 1907—

SS. *Christen Knudsen*, Dominion Coal Co., struck on Barratte Ledge, below Quebec. November 28, near midnight, bottom badly damaged. Returned to Quebec November 29 for repairs.

COMPARISONS.

The great excavation works of the world are:—

The Suez canal.

The Panama canal.

The River St. Lawrence Ship Channel.

The Suez canal after so many failures was finally opened for navigation in 1869.

The length was 100 miles.

It has been improved and enlarged from time to time, and like the St. Lawrence channel it may never be completed, the size of ships so steadily increasing.

The present width at bottom is 101 feet, and the depth $29\frac{1}{2}$ feet. Vessels of 18,000 tons navigate without trouble.

The Panama canal in course of construction, has a length of 49 miles. The proposed width is from 200 feet minimum, to a maximum of 500 feet.

It is expected to be completed by about 1915.

The old French Company, from 1881 to 1889, excavated 12,600,000 cubic yards.

The New French Company, from 1895 to 1904, excavated 10,000,000 cubic yards.

The United States from 1905 to date, have excavated over 20,000,000 cubic yards, making in all just about one half of the total estimated 80,000,000 cubic yards.

The United States, with its army of 30,000 men excavated last year 11,000,000 cubic yards. The ship channel, with its organization of dredge men, ship yard and repair men, amounting to less than 1,000, in seven months, excavated 4,800,000 yards at a cost of less than 10 cents.

The estimated total to make the 30 feet from Montreal to the sea, was 70,000,000, and at the end of the fiscal year 56,000,000 yards had been successfully dredged.

The River St. Lawrence Ship Channel therefore, compares very favourably with other great works, both as to navigability and to successful construction.

MARINE SIGNAL SERVICE.

The commencement of night navigation, and the increase in size and importance of ships, as well as the general improvement on all sides, especially features in connection with accidents, called for a system of signal service.

It was frequently found that by prompt action serious results from accidents

SESSIONAL PAPER No. 21

could have been avoided, and sometimes signals of danger could have prevented bad accidents. The government of Canada therefore, through the Minister of Marine and Fisheries, took up the matter at the last session of parliament and established in connection with the River St. Lawrence ship channel a telephone service extending between Montreal and Quebec, and since extended to Crane island.

There are twelve stations, all connected directly with the central station in the harbour commissioners' office at Montreal, established at the following places:—

Montreal.. . . .	Day and night operators.
Longue Pointe.. . . .	Day and night operators.
Verchères.. . . .	Day operator.
Sorel.. . . .	Day and night operators.
Three Rivers.. . . .	Day and night operators.
Batiscan.. . . .	Day operator.
Cap à la Roche.. . . .	Day and night operators.
Portneuf.. . . .	Day operator.
St. Nicholas.. . . .	Day and night operators.
Cap Rouge.. . . .	Day operator.
Quebec.. . . .	Day and night operators.
Crane Island.. . . .	Day and night operators.

The value of this service which was commenced September 1, 1907, was such that expressions of satisfaction were received every day during the season of navigation, when orders may be given, information as to the whereabouts of vessels obtained, and signals to passing vessels recorded.

The service has also been very useful in connection with the dredging operations as communication can be made immediately with the officials at the shops at Sorel, where orders can be given for repairs, and owing to the promptness of this service a great deal of time has been saved.

Another great advantage is, that it is possible to connect directly with the superintending engineer in his office at Montreal should anything come up requiring his immediate attention.

NEW ELEVATOR DREDGE.

In order to expedite the work at Cap à la Roche and Cap Charles, the department has decided to build another elevator dredge for working in rock. This dredge is to be modeled after the *Baldwin* (No. 6), but the hull is to be built of steel, and is to be able to dredge rock in 50 feet of water.

An appropriation for this vessel has been placed in the Estimates for 1908-1909, and she will be built at the Sorel shipyard.

NEW STEEL SPOON DREDGE.

The new steel spoon dredge now under construction at the Sorel shipyard, and which is expected to be ready for work during the present season, will be the most powerful dredge of this type afloat. She was designed by Mr. John Kennedy, consulting engineer of the Montreal Harbour Commissioners.

This dredge is intended for work at Cap à la Roche. It will tear out the bank quickly, and afterwards an elevator rock dredge will go over the ground to clean up and make a smooth bottom.

The following are her dimensions:—

Length moulded.. . . .	108 feet 0 inches.
Breadth moulded.. . . .	42 " 0 "
Depth at bow.. . . .	11 " 6 "
Depth at stern.. . . .	9 " 9 "
Length of boom, centre to centre.. . .	55 " 3 "
Length of spuds.. . . .	74 " 0 "
Main engines, 2 compound.. . . .	16 and 30 x 22 inches.
Swinging engines, simples.. . . .	10 ins. x 14.
Capstan engines, simples.. . . .	10 ins. x 14.

8-9 EDWARD VII., A. 1909

The capacity of her bucket is to be 10 cubic yards. The pull on the bucket rope equals 180,000 lbs. The dredge will be able to work to 50 feet. She will be equipped with electric light.

The steam for the machinery is to be provided by one marine boiler 12 ft. diameter by 10 ft. long, with two Morrison furnaces, the boiler having a working pressure of 160 lbs. per square inch.

THE NEW STEEL TWIN SCREW HOPPER HYDRAULIC DREDGE 'BEAUJEU' (NO. 8).

Steel hull.—Length, 275 feet; breadth, 45 feet; depth 22 feet; unloaded draught forward, 8½ feet; aft, 15 feet; with 200 tons of coal on board. Draught when loaded with 2,000 cubic yards of blue clay, forward, 13 feet; aft 17½ feet.

Equipped with twin screw propellers.

Main engine for propellers, two triple expansion engines 500 horse-power each. Cylinder diameter 15 x 8 x 48. Stroke, 24 inches.

Turbine Engine.—One triple expansion engine 15 x 28 x 48. Stroke, 24 inches.

Boilers.—Two Scotch type boilers, diameter outside 12 feet, with three furnaces each, 42 x 72 inches long; steam pressure 180 lbs.

One donkey boiler for winch purposes.

Winches.—The dredge is equipped with two winches, one forward and one aft, for moving purposes. Also a windlass powerful enough to haul two anchors at the same time, each weighing 5,000 lbs. and 600 feet of chains.

Steering Gear.—One double cylinder steering gear.

Electric plant of 300 lights capacity.

This Hopper dredge can work at 55 feet deep and raise 2,000 cubic yards of blue clay in one hour.

The construction of this dredge began at the Sorel shipyard on October 5, 1905, and the dredge was launched December 2, 1906 and delivered to the operating branch of the department November 1, 1907, and was taken down to St. Thomas de Montmagny and worked there until November 15 when it was taken back to Sorel.

WINTER NAVIGATION AND ICE BREAKING.

The question of winter navigation in Canada, has three distinct phases.—

1. Experimental navigation.
2. Special work with ice breaking steamers, for prolonging the season, preventing floods or delivering supplies and mails to distant settlements cut off from communication.
3. Commercial navigation with ordinary types of ships.

The first two of the above types of navigation being non-paying, they must be considered as legitimate cares of the Government.

The Department of Marine and Fisheries has for many years conducted experiments with a view to demonstrating possibilities of navigation, especially to Hudsons' Bay.

Winter communication between the mainland and Prince Edward Island has also been a matter of study, and the design and construction of steamers for this important and difficult service.

During the past few years the question of prolonging the season of navigation, the prevention of floods and the winter communication with settlements on the distant north shore of the St. Lawrence, has been taken up by the department, especially on the representation of the Transportation Commission.

The ice canoe having given place to a regular service of steam ferry steamers at Quebec, a steam ice breaker was called for to give service between the Intercolonial railway and Murray Bay.

The service to distant points on the Lower St. Lawrence north shore, has for the

SESSIONAL PAPER No. 21

last two winters been maintained by the special ice-breakers *Montcalm* and *Lady Grey*.

The *Lady Grey* was designed as a surveying, towing and wrecking ice-breaker, especially for the river between Montreal and Quebec. If a wreck should occur late in the season the *Lady Grey* is now available, although ordinary wrecking plant would be out of the question. She is also of great service in accompanying vessels to sea late in the autumn when there is ice in the river.

The winter ice operations of this vessel, which forms a part of the ship channel equipment, are given in full, with special reports as follows:—

At the close of the season of 1907, the *Lady Grey* was assigned to the duty of assisting out-going vessels to the sea.

The SS. *Borgestad* having been delayed until December 2, and the weather turning severe, called upon the ice-breaker to accompany her. Starting at 6.20 a.m., from Sorel, the two steamers encountering a thick snow storm, were obliged to anchor at Three Rivers. The weather moderating, they proceeded, but had to anchor again at Batis-can for the night.

The following day, although very cold, the weather was clear and the vessels reached Quebec without trouble.

Mild weather having set in, the river remained open, and SS. *Dunelm* from Great Britain, loaded with steel for the Upper Lakes, arrived at Quebec on December 9. Leaving on the 11th, this vessel called for assistance to pass Lake St. Peter, the buoys being all removed. The steamer *Frontenac*, fitted with an auxiliary ice prow, went to Three Rivers, and by placing temporary marks, succeeded in conveying the *Dunelm* through Lake St. Peter, and Montreal was reached in safety on the 13th. This is the record of the latest ocean vessel reaching Montreal.

The *Lady Grey* was retained in Quebec during the winter, the Quebec ice-breaker having been disabled. The Cap Rouge ice-bridge not having taken, the crew were paid off and the ship laid up.

On January 20 the *Montcalm* being still in dock, the *Lady Grey* was called upon to undertake an unexpected trip to the North Shore, although scarcely large enough for such service. By working night and day the vessel was fitted out and put in readiness on February 25.

Capt. Mercier received his instructions from the department to start on the 29th if the weather and ice conditions were favourable.

Freight, passengers and mail were taken on board and the *Lady Grey* left Quebec at 5 a.m. on the 29th for north shore points and Anticosti. The weather was overcast but otherwise fine.

The river was covered with loose pieces of drift ice about 10 inches thick. These conditions continued to St. Roch Traverse, where the ice became much heavier, increasing to 15 inches in thickness. This continued, closely packed, down to Murray Bay, where clear water was reached.

Opposite Cap Salmon, a small field of drift ice, about 3 miles by half a mile, was encountered, having a thickness of from 15 to 18 inches.

The *Lady Grey* arrived at Tadousac at 2.30 p.m., where freight was landed. Owing to a gale from the north, with intense cold, it was decided to remain at Tadousac for the night.

On March 1 the weather was fine, but cloudy, with a cold north wind blowing.

The steamer left at 5.30 a.m., and when off Portneuf (en bas) at 8.45, very heavy loose batture ice was met with, having a thickness of about 2 feet, solid green ice, covered by a foot of snow. This ice was composed of large cakes of about 50 feet in diameter, and extended as far as could be seen from the bridge of the ship. The vessel slowed down for safety, but experienced no difficulty in working her way through at an average speed of 10 miles an hour.

When off Bersimis Point at 11 a.m., the ice cakes were more scattered, and the ship ran into comparatively clear water at noon. From Pointe des Monts to Pentecost

8-9 EDWARD VII., A. 1909

river, a distance of about 26 miles, the river was quite clear, with no ice in sight. At 6 p.m., the *Lady Grey* anchored for the night.

On Monday morning, March 2, the steamer lifted anchor at 5.30, reaching May Island at 7 a.m., and landed about 5 tons of freight, continuing on at 8 a.m. for Seven Islands. The weather was fine with a very cold northwest wind.

The *Lady Grey* arrived off Seven Islands at 10 a.m., where the bay ice was found to be too thick for entrance by the western passage. The captain then decided to try the middle passage, but found the ice still thicker and piled up in some places to a height of 20 feet. Finally an attempt was made to get in by the eastern passage, where the ice was found to be thinner, and about 12 to 15 inches thick. A passage was effected for a short distance, and the Seven Islands mail and part of the freight landed and transferred to the mainland by dog sleighs.

At 1.30 p.m. a report was received from the signal station at Quebec to prepare for an easterly gale with snow. As a precaution, it was decided to go the western passage and break far enough in to get shelter. A passage of two miles was made with the ice 28 inches thick in most places. The balance of the freight was then landed and 11 passengers were taken aboard for Quebec.

On March 3, the weather being fine and clear, with a light but very cold north-east wind, a start was made at 2 p.m. for Anticosti. At 3.30 a large field of closely packed ice, averaging from 5 to 6 feet in thickness, was met with about 15 miles from Seven Islands, and the ship was experiencing great difficulty in forcing a passage. This field extended as far as could be seen from the topmast.

The steamer had not sufficient coal to risk being caught in the ice for any length of time, so in view of a very unfavourable weather report received at Seven Islands, the captain decided not to endanger his ship by making further attempts to reach Anticosti, but to return to Quebec.

At 3.45 p.m. the ship turned back and met no ice until off Pointe des Monts, where salt water ice was encountered of from 4 to 5 inches in thickness, and was making fast.

At 10 p.m., off St. Nicholas, the steamer ran into closely packed ice varying from 10 to 15 inches thick, and had considerable trouble in forcing her way through. This field, as far as could be judged from the lookout, extended the width of the river, or about 30 miles, and as the ship was making but slow progress, it was decided to wait for daylight.

At daylight on March 4 open water was seen towards the north shore, to which point the vessel slowly worked her way. Closely packed ice, with occasional open spaces, extended as far as could be seen from the topmast, and continued under similar conditions up to 20 miles above Bic Island, where the steamer ran into clear water. The *Lady Grey* continued up to Tadousac and went to the wharf for the night.

On March 5, at 5.30 a.m., the *Lady Grey* left for Quebec. The weather was fine, with a southwest wind.

Clear water was found as far as Cap Salmon. At this point the river was covered with loose floating ice of about 8 inches in thickness, which the ship broke through with little trouble.

Passing the Lower Traverse at 11.30 a.m. the ice was found to be somewhat thicker and more closely packed.

From Crane Island to Ile Bellechasse, very heavy packed and piled ice, which had jammed at Quebec the day previous, was met with, some cakes being 20 feet in thickness. The steamer managed, after much difficulty, to work her way through, and from Bellechasse upwards this drift ice became thinner. The *Lady Grey* continued up, reaching Quebec at 4.40 p.m. The mails, which had not been delivered at Anticosti, were immediately landed.

Orders were received from the department at Ottawa to pay off the crew, but to keep the boat in readiness for any emergency call.

SESSIONAL PAPER No. 21

According to information gathered from residents on the north shore, where the steamer stopped, it was learned that the best part of the winter for navigation, with regard to ice conditions, is during the latter part of December and during the month of January. On the other hand, snowstorms are more frequent during this period.

During the month of January the ice is affected very much by the wind. The large, heavy fields usually remain in the middle of the Gulf, being shifted from one place to another by the changing of the wind. In the case of a gale continuing for two or three days, the ice then reaches the lee shore.

RIVER ST. LAWRENCE SHIP CHANNEL.

SOREL, P.Q., May 5, 1908.

Mr. G. J. DESBARATS, Acting Deputy Minister,
Department of Marine and Fisheries,
Ottawa, Ont.

SIR,—I have the honour to report for the information of the department, on the breaking up of the ice in the River St. Lawrence between Montreal and Quebec, by the steamer *Lady Grey*, in April, 1908.

The St. Lawrence ice conditions during the winter of 1907-8 were somewhat unusual.

The taking of the ice occurred about fifteen days later than usual, a ship actually arriving in Montreal from the sea, on December 13, 1907.

Lake St. Peter froze over in stages, with the result, that covering a large area of the deep water, the ice was shoved and rafted. Mr. V. W. Forneret, resident engineer, reported that during his winter work in March, 1907, the ice in the middle of Lake St. Peter was of unusual thickness, the ice-chisels to make holes through, requiring to have their handles lengthened to eight feet.

The Cap Rouge ice-bridge did not take, during the whole winter, and the river was open up to near Batiscan. As a result, the level of water in April was lower than usual, and the ice remained firmly attached to the shores and battures.

The weather in April was also exceedingly severe, zero weather being frequent up to the 20th.

On April 22, there were several ocean vessels in Quebec, waiting for the river to clear before proceeding to Montreal, the inside basin at Quebec being also solidly frozen.

The Hon. Mr. Brodeur, Minister of Marine and Fisheries, communicated with me on the 22nd, to know if anything could be done to aid in opening up navigation.

I informed the minister that the *Montcalm* was of too deep draught for service above Platon, and that she was already in the gulf, but that the *Lady Grey* had been made ready for emergency orders.

The situation then was that it was expected that naturally the ice would clear in a few days, and in any attempt to break it, especially when liable to shove at any moment, there was grave danger to the ice-breaker on account of the lack of sheltered positions, and of the liability of the ship being forced ashore.

The minister stated that the matter was urgent, and advised a consultation with the Shipping Federation, the danger of the vessel being put out of commission to be explained, and then an attempt to be made, all possible precautions being taken.

The Shipping Federation was consulted and the hazard of the work pointed out. They were pronounced in the opinion that the ship was too valuable to St. Lawrence navigation during the season to be risked in serious damage, and it was decided to make a trial, and if found too dangerous, to order the *Lady Grey* to shelter at Quebec.

Arrangements were immediately made, and Mr. N. B. McLean, assistant engineer, was instructed to proceed to Quebec to act as executive officer in general charge. The best pilot in our service was also sent to render all possible aid, which was afterwards

8-9 EDWARD VII., A. 1909

found to have been a wise precaution on account of his knowledge of the river in the absence of lights.

Captain Mercier, the officer in charge of the *Lady Grey*, handled the vessel to every advantage.

The attached report of Mr. McLean, with photographs taken by him, will give all the details of the work from day to day, making a very valuable record.

The ice was found to be much more solid than expected. It was so firmly jammed, and attached to the shores, and of such unusual thickness, that it would most certainly have held firmly for at least another week, to the delay of the fifteen vessels already waiting at Quebec.

The staunchness of the *Lady Grey* and her suitability of design and power for work between Quebec and Montreal was demonstrated. It is probable that no other ice-breaker of her size was ever put at so difficult a task. The work was well accomplished and every precaution for safety taken, to the very great credit of Mr. McLean, and the officers and crew of the *Lady Grey*.

A close inspection of the steamer to-day shows the bow and the hull cleanly scoured by the ice, but the vessel absolutely undamaged. The only mishap being the loss of one anchor.

The difficulties and danger to a ship working in ice in narrow water with a rapid current is not generally appreciated and I would not advise that such work be undertaken, without careful consideration of the risks, but I am glad to report that on this occasion the results were far beyond my expectations, and the *Lady Grey* is still ready for service, and in fact leaving immediately for below Quebec with the two large dredges to help the commencement of the dredging and to sweep the Beaujeu channel.

I am, sir, yours obediently,

F. W. COWIE,

Superintending Engineer.

RIVER ST. LAWRENCE SHIP CHANNEL,

SOREL, P.Q., May 5, 1908.

SIR,—According to your instructions of April 23, I proceeded to Quebec to take charge of the attempt to break up the ice-jams in the River St. Lawrence between Batiscan and Contrecoeur, to enable the large number of vessels detained at Quebec to reach Montreal as soon as possible.

Captain Joseph Laforest, of the C. G. S. *De Lévis* was taken along according to your instructions, so as to have the best pilotage service for the hazardous work, there being no buoys, and as considerable manœuvring had to be done outside the actual ship channel.

We arrived at Quebec at 6.30 a.m. on April 24, and immediately went on board the *Lady Grey*, where all was in readiness. At 9 a.m. we left the outer basin, and with the rising tide proceeded up river. Weather fine, bright and calm.

There were no buoys, but the shore lights and marks made navigation easy.

From Quebec to St. Nicholas some broken cakes of ice were met with, but above the latter place the channel was clear of ice all the way to Cap Levrard.

We passed abreast of Pointe aux Trembles (*en bas*) at 10.20 a.m., Cap Santé at 11.15 a.m., St. Jean des Chaillon at 12.50 p.m. All the way up everyone had turned out to see the ice-breaker, the work being considered impossible. Flags were hoisted in our honour, and salutes exchanged.

At 1 p.m., one mile below Cap Levrard we met a large field of floating ice, which had broken away at Batiscan, but had no great difficulty in working through it for a length of about two and a half miles, when clear water was again reached, which extended up to Pointe Citrouille.

Batiscan was reached at 1.40 p.m. The shore ice was still solid there, so we broke

SESSIONAL PAPER No. 21

our way into it about 300 feet, and then walked ashore to telephone you report of progress, and for further orders.

At Batiscan also the whole village had turned out to see the novel sight. Many questions were asked, and various views expressed as to whether we would get through or not. There was, however, no time for discussion, the orders being to continue up, and if considered possible, continue to Three Rivers, but if found to be imprudent, to return to Batiscan, and take best possible shelter below the wharf. At 2.15 p.m. the *Lady Grey* turned her head up stream once more.

About a quarter of a mile above Pointe Citrouille light, at 2.40 p.m., we encountered the first solid body of ice bridged from shore to shore, and as far as we could see there was ice all the way to Ile Bigot at least. For a couple of miles this ice was comparatively soft, and we ran through it without any trouble, and after being broken it immediately commenced to move down. At about a mile below Champlain the ice was more or less jammed and rafted, but we were able to work our way through, though occasionally we were brought to a stop, and had to back up and take a run at it. This jammed ice continued until we were abreast of Ile Bigot at 3.50 p.m., when we ran into an area of clear water. Our passage through the Champlain channel, broke the jam, and this ice started immediately to drift away with the current.

From Pointe Citrouille up to Ile Bigot, the river bank was lined with crowds of interested and excited spectators. Apparently everyone was there, to the oldest inhabitant. Flags were flying everywhere and dipped repeatedly for us as we passed, and here and there a group would fire salvos from fowling pieces by way of a salute to the *Lady Grey*. These salutes were, of course, duly returned.

From Ile Bigot we ran into clear water until we were opposite the low light at Becancour. Here we met ice that was jammed hard and solid, and we started to 'buck' it.

'Bucking' is a descriptive term, and consists in backing the ship 400 or 500 feet, and then making a run at the ice. We did well for three of these runs, breaking our way from 100 to 200 feet at a time, but at the fourth trial we were not so successful, as we ran up on the ice and remained there, probably not having struck the key to the bridge, where it was apparently solid to the bottom of the river. For more than half her length, the ship was on the ice, and for three hours, doing all we could, she remained fast. We pumped out the after tanks, but it did no good. We filled them and it was the same story. We backed her, put one engine ahead and one astern to try and swing her, but still she would not move. Then we filled her after boats with water to try and raise her bow a little, but without result. Finally, after three hours in this position, and as a result of the churning and washing away of quantities of ice by the propellers, at 7.15 p.m. the ship slid off with a rush. At this moment the jam broke.

For the next twenty minutes it was an anxious time, as we still had a good deal of 'bucking' to keep clear of the shoal water, which was pretty close to us on the port side, with the current setting us that way all the time. When the bridge broke, it being nearly dark, the ice opened slightly in front, and orders were immediately given to attempt the weak point and get through, rather than risk being 'pinched.' After half an hour of heavy work, only holding our own, the heavy ice of the key was cleared, and we continued towards Three Rivers.

By this time it was quite dark and the Cap Madeline upper lights were not lit, though all the other lights in sight were burning brightly. These upper lights were very necessary to us as we had to run up on them until we ran into the line of the Cap Madeline lower lights. However, just before dark, Mr. Perrault and Captain Laforest had picked up a leading light in a house near Cap Madeleine Church, and from this were able to hold their course sufficiently close to enable us to run up till we were on the other range, and from there it was plain sailing to Three Rivers.

All the way up from the jam at Becancour to Three Rivers we were meeting large

8-9 EDWARD VII., A. 1909

fields of ice, but were able to work our way through them successfully, and arrived at Three Rivers at 8.45 p.m., when we tied up to the lower end of the wharf.

During the time that we were retarded by being hung up in the ice-jam at Becancour we were in plain sight of Three Rivers, where throngs of people were observing our efforts from the wharfs and boulevard. It was afterwards learned that considerable money changed hands on the question of the possibility of our reaching Three Rivers. Torches were blazing on the Quai Bureau and the city front was in a general state of excitement. Several hundreds of people were on the wharf to congratulate the *Lady Grey*, and bid her welcome as she moored safely alongside for the night.

On Saturday morning, April 25, as the lake ice did not appear to be coming down, we left Three Rivers at 9.40. At 10 o'clock, one and a half miles below Port St. Francis, we ran into ice averaging about 2 feet in thickness, which was firmly jammed there. We worked our way up through this as far as Nicolet Traverse, meeting strong ice all the way, which frequently brought us to a standstill, when we had to back up and go at it again 'full steam ahead.' Our passage through everywhere broke the bridge, but we turned and ran a cut down through the ice to clear water to make sure that it would not jam again.

Returning to the lake at 11.30, we reached a point about half a mile below light pier No. 3. Here we encountered packed green ice from two to four feet thick and very tough. We worked until 1 p.m., when we arrived opposite the pier, but had only broken a channel of about the width of the vessel. It did not seem wise to continue up with the probability of straining the ship, as we were gaining only half a mile in an hour and a half, from the direction of the channel, so at 1.10 p.m. we swung around by backing into the ice, and came down, breaking up a small jam at the foot of Nicolet Traverse, and then continued on to Three Rivers, where we arrived at 2.35 p.m., when I again telephoned you report, and for further instructions.

The ship was not trimmed sufficiently by the stern, so we made arrangements with Leprohon & Fils to supply us with what coal we might require to trim her.

After making arrangements for coal we swung the ship into the St. Maurice river, below the lower end of the wharf, as it was considered that she would be safer there in case the lake ice came down during the night, and as the harbour master stated that there was sufficient water for us. She was taken in stern first, but we discovered there was shallow water close to the wharf, on which the vessel might be held up. We, therefore, came out and berthed her at the lower end of the wharf below the angle.

This berth seemed to be quite safe, as the ice has not shoved there so far this spring, although the upper portions of the wharf have been ripped up in several places. The captain of the *Glacial* also reported that this was a safe place.

Sunday morning, April 26, was fine and calm, with no ice running.

The crew was given permission to attend early mass, and at 9.15 we left Three Rivers and went down to Becancour where we opened up a small jam which had formed in the same place as on Friday. We ran through it a couple of times and got it well moving, and then went up river, arriving at Nicolet Traverse at 11.25 a.m. There was no ice between Becancour and Nicolet Traverse.

It was decided to break up the ice on the south side of the traverse instead of in the channel where we had been yesterday, in order that we might have plenty of room and not be in danger of being carried towards the shoal water to the north, should the whole body of lake ice start moving.

The ice was softer towards the south, and we were able to work to greater advantage, cutting the ice out in large circular slices and then cutting these in two again to insure their passage at Port St. Francis. By 3.30 we had cleared out an area about two miles long by a mile wide, including the key to the Lake St. Peter ice field.

The ice broken was from 15 to 30 inches in thickness, comparatively smooth and unbroken.

At 3.30 the whole body of lake ice was in motion and it was time to clear out for

SESSIONAL PAPER No. 21

safety. On the way down we broke up the larger fields to give them a better chance to go through. All the ice we broke to-day was well on the move and the lower pans had arrived within a mile and a half of Three Rivers.

In the afternoon the *Glacial* of Three Rivers left port with an excursion to view the *Lady Grey* at work, but as we had sent down so much ice, she was only able to come up about three miles above Three Rivers. We passed her on our way down and exchanged salutes. The excursionists were not altogether disappointed as we had a number of good-sized fields to break up fairly close to her, one in particular of packed ice, which gave us a great deal of trouble.

We arrived in Three Rivers at 4.45 p.m., and tied up for the night at the lower end of the wharf.

At 5 a.m. Monday, April 27, we left the lower end of the wharf and moved up opposite the Boulevard, where we tied up and got ready to take coal. We took 18 tons of coal, putting it on deck aft on each side of the saloon. This lifted the bow about 4 inches.

We left Three Rivers at 9.10 a.m., and about one and a half miles below Port St. Francis met large fields of ice coming down, some of which were pretty solid, but we cut the largest in two where we could. We kept on forcing our way up, breaking the ice as much as possible till we reached the White Buoy curve. At the middle of the lake the ice was noticeably softer to-day, and the trim of the ship was much better, so that we could do very good work. We met ice all the way to White Buoy curve, but it was all in motion, and there was open water about one and a-half miles to the south. At the White Buoy we encountered a very large sheet of packed ice lying about across the lake and apparently about 5 miles long by a mile or two miles wide. We broke our way into this for half a mile, taking two hours to do it on account of the rafted ice and frazil, and still had half a mile to go. It might have been possible to have cut through this piece and reached Sorel by night, but it was considered wise to go back to Three Rivers in case this field should jam at Port St. Francis. Above this field there was open water as far as could be seen with the exception of some small broken pieces.

At 1.30 we turned back and ran down, breaking up all the larger fields on the way, opening up a slight jam at Port St. Francis, and then going on to Three Rivers, where we arrived at 3.30 p.m. and tied up.

The river all the way from the lake was practically full of heavy ice from shore to shore.

The ice we met to-day, with the exception of the packed ice, was from one to two and a-half feet thick, strong green ice. The packed ice was from three to four feet thick, very tough and hard to break.

On the morning of April 28, at 6.25, we left Three Rivers with a great deal of running ice in the river. One mile below Port St. Francis we met the heavy pan of packed ice which we had left yesterday at the White Buoy curve. It had been considerably reduced in size, and the rain during the night had softened it, so we were able to work through it, though it was still pretty tough, and we had to back up and go ahead again a number of times.

At 7.50 a.m. we were opposite Port St. Francis wharf, the river was full of ice, but all on the move, and much softer than yesterday, so that we kept right ahead till we ran into clear water about two miles above No. 3 curve. There was some ice to the north, but of no consequence, and the south side was clear. From here on it was plain sailing, only a very little loose ice being met with.

We continued on with clear water through the lake, and arrived at Sorel at 10.10 a.m.

I remain,

F. W. COWIE, Esq., C.E.,
Superintending Engineer,

Yours very truly,

(Sgd.) N. B. McLEAN.

River St. Lawrence Ship Channel,
Montreal, P.Q.

THE WORKING STAFF ORGANIZATION.

The dredging fleet and the channel operations are maintained and directed during the season of navigation under the superintending engineer.

The ship yard, shops and store are managed by the director of ship yard. When the plant is out of commission and at the ship yard, the care is taken by the ship yard officers, who make the necessary repairs. The construction of new plant is made at the ship yard to the requirements of the operating staff.

Under the superintending engineer of the ship channel, Mr. V. W. Forneret, B.A. Sc., C.E., directs the placing of the dredges, their supervision and operations. The excellent report of Mr. Forneret is given in full with regard to the operations of the plant and the various matters connected with the channel. The position is one of great responsibility and Mr. Forneret has proved himself fully equal to the important task.

Mr. N. B. McLean, a graduate of Kingston Military College, is in charge of the sweeping and various other duties. His report on the attempt to open up navigation early during the present season, is also given as of general interest.

Mr. A. E. Beauchemin, M.E., is local superintendent for the work below Quebec. To him is due in a great measure the success of that work.

Mr. M. C. Blais, employment officer at Sorel, and Mr. D. Champagne, paymaster, carry out their duties of keeping the crews complete and the records up to date, in a most exemplary manner.

Mr. F. A. Wise, C.E., and Mr. E. V. Collier and Mr. Fraser complete a steady, enthusiastic and hard working staff.

The men, from the captains to the sailors, deserve the utmost praise. It would be hard to imagine a more experienced, steady and reliable organization of men.

Ten years ago there were only two or three certified officers or men in the fleet. Pilots there were almost none. Discipline was mostly lacking.

At the present time the captains and engineers hold certificates. The younger men are exerting themselves in winter to better their education, and the type, qualifications and discipline is becoming markedly good, and a credit to the department.

RIVER ST. LAWRENCE SHIP CHANNEL,

C.G.S. 'FRONTENAC,'

SOREL, QUEBEC, July 9, 1908.

SIR,—I beg to present the following report on the dredging operations for the improvement of the River St. Lawrence ship channel during the fiscal year ending March 31, 1908.

The sweeping of the channel was carried on during the whole season of 1907 under the direction of Mr. N. B. McLean, C.E. and staff, and no obstruction of any serious nature was found.

The two semaphores indicating the channel depths in their respective localities were maintained as usual.

The gauge for the St. Jean des Chaillons semaphore, which indicates the depth in the Cap à la Roche dredge cut, was placed on May 20, and the semaphore started immediately.

The gauge for the St. Nicholas semaphore indicating the depth over the undredged St. Augustin bar was placed on June 27 and the semaphore started on the same day.

Respectfully yours,

V. W. FORNERET, B.A. Sc.

Assistant Engineer,

F. W. COWIE, Esq., C. E.,

Superintending Engineer, River St. Lawrence Ship Channel,

57 Common Street, Montreal, P.Q.

SESSIONAL PAPER No. 21

The average depth in the Ship Channel, available for navigation, with the greatest and the least depths in each year, from May to November, since 1890, is given in the following table:—

Year.	AVERAGE DEPTH FOR EACH MONTH IN THE 27½ FOOT CHANNEL. (27½ feet at Ordinary Low Water).												FROM SOREL GAUGE DURING EACH YEAR MAY TO NOVEMBER.					
	May.		June.		July.		August.		Sept.		Oct.		Nov.		Highest.		Lowest.	
	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
890.....	35	6	35	3	31	9	30	6	30	9	29	9	30	6	37	0	29	0
891.....	34	6	31	3	29	9	29	9	30	0	28	3	28	3	36	9	27	3
892.....	31	0	31	9	31	6	30	6	28	9	28	3	28	3	33	6	27	3
893.....	36	0	34	3	30	9	29	9	29	6	28	6	28	0	37	6	27	6
894.....	34	6	31	9	31	0	29	2	28	3	28	9	29	0	36	0	27	7
895.....	33	3	31	3	28	3	28	3	27	6	26	9	26	9	34	6	25	10
896.....	33	6	30	6	28	9	28	0	27	6	27	9	29	0	37	0	27	4
897.....	35	6	32	6	30	3	29	3	28	0	27	0	27	6	37	0	26	5
898.....	31	6	30	9	29	8	28	6	28	2	28	3	28	6	32	1	26	9
899.....	36	2	31	9	30	3	28	6	27	6	28	0	27	9	37	9	26	9
900.....	33	6	30	9	30	6	29	6	28	1	28	9	29	2	35	9	27	4
901.....	34	3	31	10	29	2	28	3	27	7	27	4	27	3	36	3	26	6
902.....	32	2	32	2	32	2	29	4	28	1	28	1	29	0	34	1	27	6
903.....	33	0	30	11	30	5	29	5	28	4	29	0	27	11	32	8	26	11
904.....	36	3	34	5	30	9	29	5	29	5	30	4	29	3	37	4	28	1
905.....	31	10	30	8	29	7	29	0	28	0	28	5	28	1	33	6	27	1
906.....	32	4	31	5	29	3	27	11	27	3	27	4	27	6	33	3	26	9
AVERAGE DEPTH FOR EACH MONTH IN THE 30 FOOT CHANNEL. (30 feet at the Extreme Low Water of 1897).																		
	May.		June.		July.		August.		Sept.		Oct.		Nov.		Highest.		Lowest.	
907.....	37	1	35	9	34	3	32	10	32	4	32	9	33	7	38	3	31	10

COST OF SHIP CHANNEL TO DATE.

TABLE showing the Total Cost of the Dredging and Plant and the Quantities Dredged to March 31, 1908.

	Cost of Dredging.	Expenditure for Plant, Shops, Surveys, &c.	Quantities Dredged.
	\$ cts.	\$ cts.	Cub. yds.
<i>Montreal Harbour Commissioners 1851 to 1888.</i>			
Dredging, Montreal to Cap à la Roche, to 27½ feet at ordinary low water, and from Cap à la Roche to Quebec to 27½ feet at half tide	3,402,494 35	534,809 65	19,865,693
<i>Department of Public Works.</i>			
Dredging, consisting of widening and cleaning up of channel, deepening Cap à la Roche to Cap Charles to 27½ feet at ordinary low water, and dredging at Grondines, Lotbinière and Ste. Croix, 1889 to June 30, 1899	829,583 08	486,971 79	3,558,733
Project of 1899—Dredging channel between Montreal and Quebec to 30 feet at lowest water of 1897, also widening to a minimum width of 450 feet and straightening—			
Fiscal year 1899–1900.....	100,191 01	265,270 78	1,107,894
" 1900–1901.....	136,680 83	287,040 04	2,479,385
" 1901–1902	185,429 80	479,731 47	3,098,350
" 1902–1903... ..	255,776 55	277,703 50	6,544,605
" 1903–1904.....	276,958 59	308,765 44	4,619,260
<i>Department of Marine and Fisheries.</i>			
Fiscal year 1904–1905.....	311,087 93	266,460 33	2,716,220
" 1905–1906	431,768 30	125,107 37	4,047,530
" 1906–1907 (July 1, 1906, to March 31, 1907).....	302,677 37	80,613 26	3,001,010
" 1907–1908.....	478,209 66	179,339 78	4,831,875
	6,710,857 47	3,291,813 41	55,870,555

DREDGES.

Laval (No. 1).—Of the fleet of ship channel dredges, this is the oldest. The hull is of wood, constructed in Ottawa in 1894. The buckets are made of cast-steel for work in rock and other hard material.

The details of the operations of this dredge for the fiscal year beginning April 1, 1907, were as follows:—

The dredge had been thoroughly overhauled during the winter and her machinery put in good order for the season's work.

On May 1, 1907, the *Laval* being ready, was taken down and laid out on Batiscan Traverse, where she had stopped in 1906, to widen and deepen the channel, the material being hard clay and stones.

This dredge finished her cut on July 13, and was then taken up to Sorel to have some repairs made before being loaned to the Montreal Harbour Commissioners for work in Montreal harbour, where, on account of strong cross-currents, this dredge was more suitable than a spoon dredge, being able to get out of the way of passing ships.

The *Laval* left Sorel for Montreal on July 20, where she was laid out of work to do some widening in the channel, the material being hard-pan, stones, and some shale rock.

SESSIONAL PAPER No. 21

The dredge continued working in the harbour of Montreal until November 27, when she was taken down to Sorel to go into winter quarters. On her arrival in Sorel she was immediately got ready to be hauled out in order to have her hull repaired and well caulked during the winter.

In a total of 179 days during which this dredge was at work, her machinery was in actual operation 65 per cent of the full working time.

The total quantity of material dredged amounted to 190,800 cubic yards, at a cost of \$37,301.09, or 19⁵⁵/₁₀₀ cents per cubic yard.

Laurier (No. 2).—The hull of this dredge is also of wood, having being constructed at the government works at Sorel in 1897.

During the winter of 1906-7 she was hauled up to have her hull repaired, repainted and well caulked. Her buckets, which were of large size, built up from cast-steel bottoms, were changed for a complete new set of cast-steel buckets suitable for rock work.

The details of the operations of this dredge for the fiscal year beginning April 1, 1907, were as follows:—

The *Laurier* was only ready for work on May 20, on account of extensive repairs. She was taken down and laid out at Cap à la Roche Curve, to widen and deepen the channel, the material being shale rock. She continued working there until November 11, when she was taken to Pointe aux Trembles (*en haut*) to clean up some lumps found in the channel by testing, the material being clay and sand.

The dredge worked until November 27, when she was taken to Sorel to go into winter quarters.

The number of days during which this dredge was in operation was 163, and the percentage of time at actual work 63.

During the fiscal year she removed 172,950 cubic yards, at a total cost of \$47,715.97, or 27⁵⁸/₁₀₀ cents per cubic yard.

Lady Aberdeen (No. 3).—The hull of this dredge is of steel, the vessel complete having been constructed at the Sorel works in 1900. The buckets are of cast-steel for working in hard material.

During the winter of 1906-7, she was given a good overhauling, and her machinery put in good order for the next season's work.

This dredge worked for a few days at Sorel before the St. Lawrence river was clear of ice, making a basin at the mouth of the Richelieu river for floating the logs for the ship yard saw-mill.

On May 6, 1907, the *Lady Aberdeen* was taken down to Batiscan and laid out to widen and deepen the Batiscan channel, the material dredged consisting of clay, sand and stones. After finishing her cut on June 17, the dredge was taken down to Cap Charles and laid out on Cap Charles Curve to widen and deepen the channel, the material being very difficult to dredge, consisting of stones, sand and shale rock.

There were a great many large stones, which necessitated the frequent use of stone-lifters.

During a very severe gale on November 6, both the dredge dump scows broke away from their moorings and were washed ashore. After a great deal of work they were both launched again, only one of them being damaged.

On November 11, the *Lady Aberdeen* was taken to Sorel to go into winter quarters. On arrival, she was made ready to be hauled up to have her hull scraped and painted.

The number of days during which this dredge was in operation was 161, and the percentage of time at actual work, 61.

The total number of cubic yards removed amounted to 133,400, at a total cost of \$48,889.52, or 36⁶⁵/₁₀₀ cents per cubic yard.

8-9 EDWARD VII., A. 1909

Lady Minto (No. 4).—This dredge is of the same type and design as the *Lady Aberdeen*. Her buckets are of cast-steel for working in rock and hard material.

The details of the operations of this dredge for the fiscal year beginning April 1, 1907, were as follows:—

For a few days before the River St. Lawrence was clear of ice, this dredge worked clearing out a sunken dredge hull, which interfered with the extension of the new ship yard coal wharf.

The *Lady Minto* left Sorel on May 2, and was taken down and laid out to work on Batiscan traverse, widening and deepening, where she had left off in 1906, the material consisting of hard clay and stones.

She finished her cut on June 15, and was then laid out for work on Cap Charles channel to widen and deepen, the material being very hard to dredge, consisting of shale rock and stones.

This dredge continued working there until November 14, when she left for Pointe aux Trembles (*en haut*), stopping at Sorel on the way up for a couple of days to have her bow winch repaired, which had broken in lifting her bow anchors.

Dredge No. 4 left Sorel on November 18 for Pointe aux Trembles, where she was laid out on the channel to clean up some lumps found by testing, the material being clay and sand.

She worked there until November 28th, when she was taken to Sorel to go into winter quarters.

The working time of the *Lady Minto* was 179 days, the dredge being in actual operation 70 per cent of the full working time.

The number of cubic yards removed amounted to 363,600 at a total cost of \$48,672.68 or 13³⁸/₁₀₀ cents per cubic yard.

Lafontaine (No. 5).—The hull of this dredge is of wood, the work of the Sorel ship yard, completed in 1901. Her buckets are made of cast steel for working in rock and other hard material.

During the winter of 1906-7, the dredge was given a good overhauling, and new breasting winches for using wires instead of chains were installed. These winches proved to be very satisfactory after a season's work.

The *Lafontaine* left Sorel for Cap à la Roche on May 6, 1907.

The dredge was anchored at Batiscan for a couple of days to have the new breasting winches well tried and put in good working order, and also to enable the crew to get trained to the use of these winches before the dredge was laid out for work.

The dredge was laid out on Cap à la Roche curve on May 8, the material being shale rock. She continued working there until November 14, when she was taken up to start deepening Varennes channel to 34 feet at E.L.W. of 1897.

The *Lafontaine* was delayed on her way up by stormy weather, and was laid out to work at Varennes on November 18, the material being soft clay.

This dredge worked there until November 27, when her buckets came off the frame, and in doing so broke one of the side rods.

By November 30, after much difficulty, her frame and buckets were successfully raised, and she was taken down to Sorel to go into winter quarters.

The working time of the *Lafontaine* was 170 days, the dredge being in actual operation 64 per cent of the full working time.

The total number of cubic yards removed amounted to 239,000, at a total cost of \$51,762.59 or 21⁶⁵/₁₀₀ cents per cubic yard.

Baldwin (No. 6).—This is the newest of the elevator dredge fleet, the hull is of wood, constructed at the Sorel ship yard in 1902. She has large built up buckets for working in soft material, but had sufficient teeth added to enable the dredge to work in hard-pan, &c.

This dredge was laid out on Isle au Raisin channel on May 1, 1907, deepening

SESSIONAL PAPER No. 21

and widening, the material being clay. She finished her cut on June 3, and was then taken down to Cap Levrant and laid out to work at widening and deepening the curve, the material being clay and stones.

The *Baldwin* continued working there until October 22, when she was taken up and laid out to clean up some lumps found by testing on Champlain channel, and worked there until November 21. She was then taken up to Sorel to go into winter quarters.

Before she was laid up, this dredge worked for a few days deepening in front of the new ship yard coal dock.

The number of days during which this dredge was in operation was 174, and the percentage of time at actual work, 70.

The total number of cubic yards removed amounted to 583,000, at a total cost of \$49,496.40 or $8\frac{49}{100}$ cents per cubic yard.

J. Israel Tarte (No. 7).—The hull of this dredge is of steel, of the same type and general design as the steel hulls of the elevator dredges.

She was constructed in 1902 by the Polson Iron Works Company, of Toronto, Canada.

During the winter of 1906-7, her boilers were thoroughly repaired and the dredge given an overhauling generally.

The dredge left Sorel to begin her season's work on May 9, 1907, and was laid out at the foot of White Buoy curve, Lake St. Peter, to start widening, to make an anchorage basin of over a mile in length, having a maximum width of 800 feet, the material being soft clay.

After she had finished the anchorage basin, the *Tarte* continued to widen and deepen the channel between White Buoy anchorage basin and Curve No. 2.

During the week ending August 10, this dredge made a remarkable showing by stopping work for only four out of a possible 132 working hours. From midnight Sunday, to 4 a.m. Monday, the dredge did not work on account of repairs to her boilers. She then worked without a stop until noon the following Saturday, removing 175,000 cubic yards during that time.

During the season the dredge lost time through wind, especially during the latter months, but notwithstanding this she broke all previous records.

The *Tarte* was taken to Sorel to go into winter quarters on November 23.

In the 165 days, the dredge was in actual operation 68 per cent of the full working time.

The total number of cubic yards amounted to 2,795,625, at a total cost of \$124,797.29 or $4\frac{46}{100}$ cents per cubic yard.

The total number of cubic yards removed by the dredging fleet between Montreal and Quebec during the fiscal year ending March 31, 1908, amounted to 4,478,375, at a total cost of \$408,635.54 or $9\frac{12}{100}$ cents per cubic yard.

Suction dredge *Galveston* (No. 9).—The dredging operations below Quebec are under the special supervision of Mr. Albert Beauchemin, local superintendent.

At the commencement of the fiscal year April 1, 1907, the *Galveston* was still at St. John, N.B., where she had been laid up for the winter.

On April 22, work was started to get the dredge ready for the sea. She took on a load of lumber to make her more steady for the trip to Quebec, and left St. John, N. B. on April 27.

The *Galveston* stopped at Halifax on April 29, and left again next day. On May 2, she anchored at Port Mulgrave on account of large quantities of ice in the Gut of Canso.

On May 3, the dredge proceeded to Port Hawkesbury, and to Port Hastings on May 6, waiting there until the Gut of Canso was clear of ice. On May 21, she went back to Port Hawkesbury, and the Gut being clear of ice, orders were received to be ready to leave.

8-9 EDWARD VII., A. 1909

Leaving Port Hawkesbury on May 23, she reached Quebec on May 27, and left again on May 28, arriving at Sorel on the same day.

After unloading her cargo of lumber, the dredge was taken to Montreal on June 5, to go into dry dock to have one of her turbines repaired and also to have her hull well scraped and painted. She came out of dock on June 13, and left for Sorel on the following day to be put in good order for her season's work.

The *Galveston* left Sorel to start work at Beaujeu channel on June 19. On arrival at Quebec the same day she went into the inner basin and took coal. She left for Beaujeu channel, Crane Island, on June 21, on which day operations were commenced.

During the season the dredge was beached several times to have repairs made.

On July 25, she had to be put into dry dock at Lévis, and came out again on July 31, when she immediately returned to Beaujeu channel.

On October 21 orders were received from the department to send the *Galveston* to St. Michel de Bellechasse to do some cleaning up opposite the wharf. This work was completed on October 23, and the dredge went back and resumed work on the Beaujeu channel until November 13, when orders were received to stop work and go up to Sorel for the winter.

The dredge was beached at St. Michel for repairs, and left for Sorel on November 15, where she arrived on the following day.

Before being laid up for the winter, the *Galveston* had her connections for discharging on shore put on, and worked for several days filling in the new shipyard coal dock .

During the season the *Galveston* worked 122 days, and made 242 loads amounting to 353,500 cubic yards, the material being sand, some soft blue clay and stones, at a total cose of \$56,937.18 or 16¹⁰/₁₀₀ cents per cubic yard.

The total number of cubic yards removed by the whole of the dredging fleet amounted to 4,831,875, at a total cose of \$478,209.66 or 9⁸⁹/₁₀₀ cent per cubic yard.

Progress of dredging operations at the date of writing, the close of the season, 1907.

Locality.	Distance English miles.	Total length requiring dredging.	Length dredged in 1907.	Total length of 30 foot channel dredged.	Length yet to be dredged.
		Miles.	Miles.	Miles.	Miles.
Division 1 :— Montreal to Sorel.....	45	22·90	.....	22·90	All completed.
Division 2 :— Sorel to Batiscan.....	36	12·45	0·25	12·45	All completed.
Division 3 :— Lake St. Peter... ..	20	18·00	2·70	*9·60 †8·40	All deepened. 9·60 to be widened.
Division 4 :— Batiscan to Quebec.....	59	10·00	1·55	4·45	5·55
Division 5 :— Quebec to The Traverse.....	60	6·65	0·75	0·75	5·90
Total....	220	70·00	5·25	58·55	11·45

*Not widened. †Widened.

SESSIONAL PAPER No. 21

Progress of the dredging operations at the date of writing, the close of the season, 1907

LOCALITY.	LENGTH OF DREDGING.		Cubic yards yet required to be done.
	Required.	Done.	
	Miles.	Miles.	
Division 1 :—			
Longueuil Shoal.....		1·10	
Longue Pointe to Pointe aux Trembles (E.H.).....		5·05	
Ile Ste. Thérèse		0·40	
Varennas to Cap St. Michel		3·00	
Cap St. Michel to Verchères.....		4·50	
Verchères Traverse.....		1·10	
Verchères to Contrecoeur.....		1·70	
Contrecoeur Channel.....		6·05	
Total.....		22·90	
Division 2 :—			
Sorel to Ile de Grace.....		4·40	
Stone Island.....		1·10	
Ile aux Raisins		0·25	
Lake St. Peter (see Div. 3)			
Port St. Francis.....		0·50	
Three Rivers.....		0·50	
Cap Madeleine to Becancour		1·55	
Becancour to Champlain		2·25	
Champlain to Pointe Citrouille.....		1·30	
Batture Perron.....		0·60	
Total		12·45	
Division 3 :—			
Lake St. Peter		9·60	6,500,000
		8·40	
Total.....		18·00	6,500,000
Division 4 :—			
Batiscan to Cap Levrard.....	0·40	2·60	100,000
Cap à la Roche Channel	1·40	0·60	700,000
Pouiller Rayer	1·00	0·20	275,000
Cap Charles.....	0·75	0·15	410,000
Grondines.....	0·80		200,000
Lotbinière.....		0·40	
Cap Santé		0·20	
Ste. Croix	0·60	0·30	150,000
St. Augustin.....	0·60		150,000
Total.....	5·55	4·45	1,985,000
Division 5 :—			
Quebec to the Traverse.....	5·90	0·75	4,550,000
Total.....	5·90	0·75	4,550,000
Totals.....	11·45	58·55	13,035,000
Cubic yards yet to be done.....			13,035,000
Cubic yards done.....			55,870,555
Total.....			68,905,555

*Not widened. †Widened.

RIVER ST. LAWRENCE SHIP CHANNEL BETWEEN MONTREAL AND QUEBEC.
CLASSIFICATION of Disbursements for Fiscal Year ended March 31, 1908.

Vessels.	Fuel.	Wages.	Board.	Stores and material.	Repairs and labour.	Expenditure: new plant, rebuilding shipyard, &c.	Proportion of general and office expenses, &c.	Expenditure for each vessel.	Stone-lifter service, elevator dredges.	Tug service.	Inspection, towing, sweeping, &c.	Total cost of operations of each dredge and plant during Fiscal Year.	Total expenditure on different appropriations.
Dredge <i>Laval</i> (No. 1).....	\$ 3,078 97 cts.	\$ 7,478 54 cts.	\$ 2,649 61 cts.	\$ 2,355 31 cts.	\$ 6,686 79 cts.	\$	\$ 1,345 06 cts.	\$ 23,594 28 cts.	\$ 908 90 cts.	\$ 8,126 67 cts.	\$ 4,671 24 cts.	\$ 37,301 09 cts.	
Tug <i>Portneuf</i>	\$ 1,189 80 cts.	\$ 3,673 80 cts.	\$ 1,390 12 cts.	\$ 530 75 cts.	\$ 878 92 cts.	\$	\$ 463 28 cts.	\$ 8,126 67 cts.	\$	\$	\$	\$	
Dredge <i>Laurier</i> (No. 2).....	\$ 6,016 53 cts.	\$ 7,438 13 cts.	\$ 2,712 86 cts.	\$ 4,317 46 cts.	\$ 9,048 02 cts.	\$	\$ 1,785 40 cts.	\$ 31,318 40 cts.	\$ 908 91 cts.	\$ 10,817 42 cts.	\$ 4,671 24 cts.	\$ 47,715 97 cts.	
Tug <i>Clavier</i>	\$ 2,623 13 cts.	\$ 4,018 46 cts.	\$ 1,623 20 cts.	\$ 794 10 cts.	\$ 1,141 85 cts.	\$	\$ 616 68 cts.	\$ 10,817 42 cts.	\$	\$	\$	\$	
Dredge <i>Lady Aberdeen</i> (No. 3).....	\$ 5,817 64 cts.	\$ 7,184 59 cts.	\$ 2,587 20 cts.	\$ 4,017 50 cts.	\$ 11,414 55 cts.	\$	\$ 1,875 43 cts.	\$ 32,896 91 cts.	\$ 908 90 cts.	\$ 10,412 47 cts.	\$ 4,671 24 cts.	\$ 48,889 52 cts.	
Tug <i>Emilia</i>	\$ 2,124 86 cts.	\$ 3,702 59 cts.	\$ 1,430 47 cts.	\$ 860 50 cts.	\$ 1,700 45 cts.	\$	\$ 593 60 cts.	\$ 10,412 47 cts.	\$	\$	\$	\$	
Dredge <i>Lady Minto</i> (No. 4).....	\$ 6,434 72 cts.	\$ 7,479 41 cts.	\$ 2,729 47 cts.	\$ 2,707 65 cts.	\$ 11,624 97 cts.	\$	\$ 1,872 65 cts.	\$ 32,848 87 cts.	\$ 908 91 cts.	\$ 10,243 66 cts.	\$ 4,671 24 cts.	\$ 48,672 68 cts.	
Tug <i>Champlain</i>	\$ 2,312 07 cts.	\$ 3,895 07 cts.	\$ 1,510 65 cts.	\$ 887 15 cts.	\$ 1,054 75 cts.	\$	\$ 583 97 cts.	\$ 10,243 66 cts.	\$	\$	\$	\$	
Dredge <i>Latontaine</i> (No. 5).....	\$ 9,637 66 cts.	\$ 7,824 45 cts.	\$ 2,441 24 cts.	\$ 3,015 85 cts.	\$ 8,460 08 cts.	\$	\$ 1,897 12 cts.	\$ 33,276 40 cts.	\$ 908 90 cts.	\$ 12,906 05 cts.	\$ 4,671 24 cts.	\$ 51,762 59 cts.	
Tug <i>Lac St. Pierre</i>	\$ 3,268 60 cts.	\$ 4,031 83 cts.	\$ 1,631 73 cts.	\$ 908 99 cts.	\$ 2,329 13 cts.	\$	\$ 735 77 cts.	\$ 12,906 05 cts.	\$	\$	\$	\$	
Dredge <i>Baldwin</i> (No. 6).....	\$ 7,392 95 cts.	\$ 7,203 51 cts.	\$ 2,598 47 cts.	\$ 2,899 29 cts.	\$ 10,016 62 cts.	\$	\$ 1,820 34 cts.	\$ 31,931 18 cts.	\$ 908 91 cts.	\$ 11,985 07 cts.	\$ 4,671 24 cts.	\$ 49,496 40 cts.	
Tug <i>St. Jean-Berille</i>	\$ 3,001 28 cts.	\$ 3,966 47 cts.	\$ 1,598 85 cts.	\$ 972 89 cts.	\$ 1,762 34 cts.	\$	\$ 683 24 cts.	\$ 11,985 07 cts.	\$	\$	\$	\$	
Dredge <i>J. Israel Tarte</i> (No. 7).....	\$ 41,751 67 cts.	\$ 13,696 61 cts.	\$ 4,525 94 cts.	\$ 14,245 61 cts.	\$ 19,417 63 cts.	\$	\$ 5,660 89 cts.	\$ 99,298 35 cts.	\$	\$ 16,156 44 cts.	\$ 9,342 50 cts.	\$ 124,797 29 cts.	
Tug <i>Montcalm</i>	\$ 2,048 08 cts.	\$ 3,984 61 cts.	\$ 1,594 54 cts.	\$ 623 55 cts.	\$ 1,070 70 cts.	\$	\$ 563 53 cts.	\$ 9,885 01 cts.	\$	\$	\$	\$	
" <i>Carmichael</i>	\$ 1,137 15 cts.	\$ 2,218 73 cts.	\$ 747 80 cts.	\$ 500 74 cts.	\$ 1,309 49 cts.	\$	\$ 357 52 cts.	\$ 6,271 43 cts.	\$	\$	\$	\$	
Dredge <i>Boujeu</i> (No. 8).....	\$ 791 29 cts.	\$ 5,455 24 cts.	\$ 1,625 59 cts.	\$ 862 12 cts.	\$ 3,182 29 cts.	\$	\$ 720 41 cts.	\$ 12,636 94 cts.	\$	\$	\$	\$ 12,636 94 cts.	
" <i>Gidreston</i> (No. 9).....	\$ 5,295 87 cts.	\$ 5,567 98 cts.	\$ 3,004 44 cts.	\$ 3,659 81 cts.	\$ 15,033 93 cts.	\$	\$ 2,210 33 cts.	\$ 38,772 36 cts.	\$	\$ 13,493 58 cts.	\$ 4,671 24 cts.	\$ 56,937 18 cts.	
Tug <i>Jas. Horden</i>	\$ 2,452 16 cts.	\$ 4,792 16 cts.	\$ 2,186 27 cts.	\$ 1,882 38 cts.	\$ 1,407 59 cts.	\$	\$ 773 02 cts.	\$ 13,493 58 cts.	\$	\$	\$	\$	478,209 66
Divided to each elevator dredge.													
Add to hydraulic dredge.	\$ 1,878 76 cts.	\$ 2,400 39 cts.	\$ 835 59 cts.	\$ 674 89 cts.	\$ 1,800 63 cts.	\$	\$ 458 87 cts.	\$ 8,049 18 cts.	\$	\$	\$	\$	
Add to hydraulic dredge.	\$ 3,109 84 cts.	\$ 5,940 50 cts.	\$ 3,370 46 cts.	\$ 1,908 53 cts.	\$ 3,809 80 cts.	\$	\$ 1,096 59 cts.	\$ 19,235 72 cts.	\$	\$	\$	\$	
Add to hydraulic dredge.	\$ 2,708 16 cts.	\$ 4,489 58 cts.	\$ 1,912 01 cts.	\$ 2,330 08 cts.	\$ 2,475 27 cts.	\$	\$ 841 18 cts.	\$ 14,756 28 cts.	\$	\$	\$	\$	

Stone-lifter No. 2 " " No. 3	Divided equally between elevator dredges.	96 65	948 98	248 73	315 93	1,221 12		171 17	3,002 58			
		18 80	1,015 78	358 48	275 21	642 86		139 72	2,450 85			
Str. <i>Lady Grey</i> (ice breaking and emergency tug).....		11,750 73	13,623 68	5,121 01	6,510 19	4,935 13		2,532 44	44,473 18			44,473 18
Construction for dredging fleet—												
Tug <i>Cartier</i> , boiler and hull							2,323 29					
Tug <i>Chaplain</i> , steering gear and windlass.....							1,118 42					
Tug <i>Jas. Horden</i> , steering gear and windlass.....							1,366 14					
Tug <i>Jessie Hunt</i> , boiler and windlass.....							1,706 23					
Str. <i>Lady Grey</i> , improve- ments to vessel.....							3,900 62					
Dredge No. 1, hull.....							1,589 54					
Coal barge No. 2, crews quarters.....							1,081 94					
Reconstruction dump scows Nos. 4, 5, 6 and 10.....							9,740 73					
New stone lifter No. 4, con- struction No. 20.....							1,154 20					
2 lodging scows.....							5,373 74					
Floating machine shop.....							2,875 62					
11 c. y. dipper dredge, con- struction No. 24.....							2,095 50					
1 flat scow.....							75 34					
Elevator dredge, construc- tion No. 26.....							5 26					34,406 57
Improvements to shipyard												
Boiler shop, new tools and machinery.....							1,375 22					
Machine shop, new tools and machinery.....							4,655 80					
Saw mill, new tools and machinery.....							3,936 50				5	
Pipe and asbestos shop, new tools and machinery.....							1,409 89					
Carpenter's shop, new tools and machinery.....							73 12					
Air and steam plant.....							669 27					
Telephone installation in shops.....							1,020 41					
Shipway, winch and diving outfit.....							5,144 25					

RIVER ST. LAWRENCE SHIP CHANNEl BETWEEN MONTREAL AND QUEBEC.

CLASSIFICATION of Disbursements for Fiscal Year ended March 31, 1908---Concluded.

Vessels.	Fuel.	Wages.	Board.	Stores and material.	Repairs and labour.	Expenditure: new plant, Rebuilding shipyard, &c.	Proportion of general and office expenses, &c.	Expenditure for each vessel.	Stone-lifter service, Elevator dredges, Tug service.	Inspection towing, sweeping, &c.	Total cost of operations of each dredge and plant during Fiscal Year.	Total expenditure on different appropriations.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Improvements to Shipyard <i>Con.</i>												
Spare floats and scow.						2,301 58						
Shipyard, railways.						673 99						
Alterations to offices.						2,802 64						
Store shed No. 5.						908 28						
Wharf No. 4.						22,873 45						
Building No. 18 (mould loft and paint shop).						15,347 91						69,169 94
Building No. 19, patterns.						5,977 63						31,290 09
Stores and materials.												
	125,937 37	136,031 09	50,434 73	58,056 48	122,424 96	103,576 51	29,798 21	522,682 84	5,453 43	91,141 36	42,041 18	478,209 66
												657,549 44

RIVER ST. LAWRENCE SHIP CHANNEL BETWEEN MONTREAL AND QUEBEC.

Details of Dredging, Locality and Cost per Cubic Yard for Fiscal Year ended March 31, 1908.

Dredges.	Total cost of opera- tions of each dredge and plant during Fiscal Year.	Number of days in operation each dredge.	Cost per day, opera- tions of dredges and plant.	Days working each locality.	Cost of work, each locality.	Total cost of opera- tions of each dredge.	Number of cubic yards dredged in each locality.	Total cubic yards for each dredge.	Cost per cubic yard. each locality.	Average cost per cubic yard dredge.	Kind of material dredged.	Locality of dredging.
	\$ cts.		% cts.		\$ cts.	% cts.			Cts.	Cts.		
<i>Lacat</i> (No. 1).	37,301 09	179	208 39	63	13,128 33	.....	141,000	.....	9 31	...	Hard clay and stone.	Batiscan Traverse.
				116	24,172 76	.....	49,800	.....	48 54	.....	Hard-pan and shale rock.	Montreal Harbour.
<i>Laurier</i> (No. 2).	47,715 97	163	292 73	148	43,324 90	.....	163,150	.....	26 55	.....	Shale rock.	Cap à la Roche Curve.
				15	4,391 07	.....	9,800	.....	44 80	.....	Clay and sand	Pte. aux Trembles Chan- nel.
<i>Lady Aberdeen</i> (No. 3)	48,889 52	161	303 66	37	37,654 05	.....	42,600	.....	26 37	.....	Clay and stones.	Batiscan Channel.
				124	11,235 47	.....	90,800	.....	41 47	.....	Shale rock, stones, some sand.	Cap Charles Curve.
<i>Lady Minto</i> (No. 4).	48,672 68	179	271 91	38	10,332 73	.....	120,650	.....	8 56	.....	Hard clay and stones.	Batiscan Traverse.
				128	34,805 06	.....	226,050	.....	15 39	.....	Shale rock and stones.	Cap Charles Channel.
				13	3,534 89	.....	16,900	.....	20 91	.....	Clay and sand	Pte. aux Trembles Chan- nel.
<i>Lafontaine</i> (No. 5)	51,762 59	170	304 48	158	48,108 76	.....	213,500	.....	22 53	.....	Shale rock.	Cap à la Roche Curve.
				12	3,653 83	.....	25,500	.....	14 33	.....	Blue clay.	Varennes Channel.
<i>Baldwin</i> (No. 6).	49,496 40	174	284 46	28	7,964 94	.....	152,700	.....	5 21	.....	Clay.	Ile au Raisin Channel.
				120	34,135 45	.....	364,500	.....	9 36	.....	Clay and stones.	Cap Levrard Curve.
				26	7,396 01	.....	65,800	.....	11 24	.....	Sand.	Champlain Channel.
<i>J. Israel Tarte</i> (No. 7).	124,797 29	165	756 35	165	124,797 29	.....	2,795,625	.....	4 46	.....	Soft blue clay.	Lake St. Peter
<i>Gidveston</i> (No. 9).	56,937 18	122	466 69	122	56,937 18	.....	353,500	.....	16 10	.....	Sand, some soft blue clay and stones.	Beaujeu Channel.
	465,572 72	1,313	.....	1,313	465,572 72	.....	4,831,875	.....	.....	.....

RIVER ST. LAWRENCE SHIP CHANNEL.

Abstract of work of Dredging Fleet during the Fiscal Year ended March 31, 1908.

Dredge.	Locality of dredging.	Time of service.	Nominal working time, 24 hours per day.	Hours actual dredging.	Number of scows filled.	Number of cubic yards dredged (sow measurement).	Depth of dredging at low water.	Width in feet.	Character of soil.	Remarks.
		Days.	Hours.				Ft. In.			
<i>Lacul</i> (No. 1)	Batiscan Traverse Montreal Harbour . . .	63	1,380	1,015½	940	141,000	30 0	450	Hard clay and stones . . .	Capt. R. Matte.
		116	2,556	1,527½	332	49,800	30 0	...	Hard pan and shale rock.	
		179	3,936	2,542¾	1,272	190,800				
<i>Aurior</i> (No. 2)	Cap à la Roche Curve Pte. aux Trembles Channel (en haut) . . .	148	3,120	2,014	1,087	163,150	30 0	150 to 550	Shale rock	Capt. C. Gendron. Cleaning up.
		15	336	169½	49	9,800	30 0	450	Clay and sand	
		163	3,456	2,183½	1,136	172,950				
<i>Lady Aberdeen</i> (No. 3).	Batiscan Channel Cap Charles Curve . . .	37	816	512½	213	42,600	30 0	450	Clay and stones	Capt. O. Gauchon.
		124	2,724	1,657½	454	90,800	30 0	450 to 600	Shale rock and stones (some sand)	
		161	3,540	2,169½	667	133,400				
<i>Lady Minto</i> (No. 4)	Batiscan Traverse Cap Charles Channel . . Pte. aux Trembles Channel (en haut) . . .	38	840	629	603½	120,650	30 0	450	Hard clay and stones . . .	Capt. B. Ladebauche. Cleaning up.
		128	2,808	1,959¾	1,130½	226,050	30 0	450	Shale rock and stones . . .	
		13	288	148½	84½	16,900	30 0	450	Clay and sand	
<i>Lafontaine</i> (No. 5)	Cap à la Roche Curve Varennes Channel . . .	179	3,936	2,737½	1,818	363,600				Capt. A. Marcotte.
		158	3,456	2,263½	854	213,500	30 0	450 to 550	Shale rock	
		12	264	124	85	25,500	34 0	450	Blue clay	
		170	3,720	2,387½	939	239,000				

SESSIONAL PAPER No. 21

<i>Baldwin</i> (No. 6).	He au Raisin Channel Cap. Levrard Curve... Champlain Channel.	28	612	363 1/2	509	152,700	30	0	450	Clay.	Capt. Louis Dauphinais. Cleaning up.
		120	2,640	1,930 1/2	1,215	364,500	30	0	450 to 600	Clay and stones.	
		26	576	396 1/2	329	65,800	30	0	450	Sand	
		171	3,828	2,690 1/2	2,053	583,000					
<i>J. Israel Tarte</i> (No. 7)	Lake St. Peter	165	3,642	2,460 1/2	2,795,625	30	0	450 to 800	Soft blue clay.	Capt. J. S. Michaud.
<i>Gidveston</i> (No. 9).	Beaujeu Channel	122	Daylight to dark.	353,500	30	0	1,000	Sand, some soft blue clay and stones.	Capt. Z. Caron.
						4,831,875					

DREDGING PLANT.

The following is a description of the dredging plant in November, 1907, owned and operated by the Department of Marine and Fisheries in connection with the river St. Lawrence ship channel :—

DREDGES.

The Elevator Dredge 'Laval' (No. 1), wooden hull.

Length over all, 150 feet.

Breadth of beam, 30 feet.

Depth of hold, 14 feet.

Average draught, 11 feet.

Greatest working depth, 42 feet.

Hull built in Ottawa in 1894.

Steel buckets.

Working capacity per day in hard material, 1,000 to 2,000 cubic yards.

The Elevator Dredge 'Laurier' (No. 2), wooden hull.

Length over all, 168 feet.

Breadth of beam, 32 feet.

Depth of hold, 14 feet.

Average draught, 10 feet.

Greatest working depth, 45 feet.

Built at Sorel shipyard in 1897.

Steel buckets.

Working capacity per day in hard material, 1,000 to 2,000 cubic yards.

The Elevator Dredge 'Lady Aberdeen' (No. 3), steel hull.

Length over all, 148 feet.

Breadth of beam, 32 feet.

Depth of hold, 13 feet.

Average draught, 8.5 feet.

Greatest working depth, 42.5 feet.

Built at Sorel shipyard in 1900.

Steel buckets.

Working capacity per day in hard material, 1,000 to 2,000 cubic yards.

The Elevator Dredge 'Lady Minto' (No. 4), steel hull.

Length over all, 148 feet.

Breadth of beam, 32 feet.

Depth of hold, 13 feet.

Average draught, 8.5 feet.

Greatest working depth, 42.5 feet.

Built at Sorel shipyard in 1900.

Steel buckets.

Working capacity per day in hard material, 1,000 to 2,000 cubic yards.

SESSIONAL PAPER No. 21

The Elevator Dredge 'Lafontaine' (No. 5), wooden hull.

Length over all, 168 feet.
Breadth of beam, 32 feet.
Depth of hold, 14 feet.
Average draught, 9 feet.
Greatest working depth, 45 feet.
Built at Sorel shipyard in 1901.
Steel buckets.
Working capacity per day in hard material, 1,000 to 2,000 cubic yards.

The Elevator Dredge 'Baldwin' (No. 6), wooden hull.

Length over all, 165 feet.
Breadth of beam, 34 feet.
Depth of hold, 14 feet.
Average draught, 8 feet.
Greatest working depth, 42·5 feet.
Built at Sorel shipyard in 1902.
1 cubic yard buckets strengthened for fairly hard material.
Working capacity per day in medium material, 2,500 to 3,500 cubic yards.

The Hydraulic Dredge 'J. Israel Tarte' (No. 7), steel hull.

Length over all, 160 feet.
Breadth of beam, 42 feet.
Depth of hold, 12·5 feet.
Average draught, 6 feet.
Length of suction frame, 80 feet.
Greatest working depth, 50 feet.
Built at the Polson Iron Works, Toronto, in 1902.
Working capacity per day in soft material, 12,000 to 20,000 cubic yards.

Discharge Pipe and pontoons of Dredge 'J. Israel Tarte' (No. 7).

23 lengths of pipe, 36 ins. diameter by 100 feet long.
1 length of pipe, 36 ins. diameter by 35 feet long.
23 pairs of pontoons for floating pipes, 42 ins. diameter by 90 feet long.

Winch Scow 'No. 3' for Dredge 'J. Israel Tarte' (wooden hull).

Length over all, 60 feet.
Breadth of beam, 18 feet.
Depth of hold, 6 feet.
Built at Sorel shipyard in 1902.

Winch Scow (wooden hull) for Dredge 'J. Israel Tarte' (with steam boiler and steam winch).

Length over all, 75 feet.
Breadth of beam, 25 feet.
Depth of beam, 5·5 feet.
Built at Sorel shipyard in 1902.

The Suction Hopper Dredge 'Galveston' (No. 9), steel hull, twin screw.

Length over all, 233 feet.

Breadth of beam, 39 feet.

Depth of hold, 15 feet 5 inches.

Draught when loaded with 1,800 tons, 14 feet 9 ins. aft, 13 feet 1 in. forward.

Greatest working depth, 55 feet.

Two suction pumps of Dutch type, 8 feet 6 ins. outside diameter.

Built in 1904.

Working capacity, 1,350 cubic yards in 45 minutes.

Hopper capacity, 1,400 cubic yards.

Sea-going Suction Hopper Dredge 'Beaujeu' (No. 8), steel hull, twin screw.

Length between perpendiculars, 264 feet.

Breadth of beam, 45 feet.

Depth of hull, 20 feet.

Capacity of hoppers, 2,600 cubic yards.

Working capacity, 2,000 cubic yards in 45 minutes.

Greatest working depth 65 feet.

Draught when loaded 15 feet.

Ordinary speed, 9 statute miles.

Built at Sorel shipyard in 1907.

TUGS.

The Ice-breaking and Sweeping Tug 'Lady Grey' (steel hull, twin screw).

Length between perpendiculars, 172 feet.

Length over all, 183 feet 6 inches.

Breadth moulded, 32 feet.

Breadth extreme, 32 feet 3 inches.

Depth moulded, 18 feet.

Draft mean to bottom of flat plate keel (normal) 12 feet.

Draft mean when ice-breaking, about 13 feet.

Displacement in tons at 12 foot draft, 1,070.

Mean speed at 12 foot draft on 6 runs over measured mile base, 14 knots.

Built by Vickers Sons & Maxim, Limited, Barrow-in-Furness, in 1906.

The Tug 'Frontenac' (composite hull).

Length over all, 113 feet.

Breadth of beam, 23 feet.

Depth of hold, 10 feet.

Average draught, 9 feet.

Built at Sorel shipyard in 1901.

The Tug 'De Levis' (wooden hull).

Length over all, 104 feet.

Breadth of beam, 20 feet.

Depth of hold, 10 feet.

Average draught, 8 feet.

Built at Sorel shipyard in 1902.

The Tug 'James Howden' (wooden hull).

Length over all, 100 feet.

Breadth of beam, 21 feet.

Depth of hold, 10 feet.

Average draft, 7.5 feet.

Built at Sorel shipyard in 1903.

SESSIONAL PAPER No. 21

The Tug 'St. Jean Iberville' (steel hull).

Length over all, 90 feet.
Breadth of beam, 18 feet.
Depth of hold, 12 feet.
Average draught, 10 feet.
Built at Sorel shipyard in 1897.

The Tug 'Lac St. Pierre' (wooden hull).

Length over all, 100 feet.
Breadth of beam, 21 feet.
Depth of hold, 10 feet.
Average draught, 7·6 feet.
Built at Sorel shipyard in 1901.

The Tug 'Portneuf' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 17 feet.
Depth of hold, 9 feet.
Average draught, 8 feet.
Built in 1875.

The Tug 'Cartier' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 18 feet.
Depth of hold, 9·5 feet.
Average draught, 8 feet.
Built at Sorel Shipyard in 1893.

The Tug 'Emilia' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 17 feet.
Depth of hold, 9 feet.
Average draught, 8 feet.
Built at Sorel Shipyard in 1898.

The Tug 'Champlain' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 17 feet.
Depth of hold, 9 feet.
Average draught, 8 feet.
Built at Sorel Shipyard in 1901.

The Tug 'Jessie Hume' (wooden hull).

Length over all, 72 feet.
Breadth of beam, 17·3 feet.
Depth of hold, 10 feet.
Average draught, 8·5 feet.
Built in Buffalo in 1878.

The Tug 'Montcalm' (wooden hull).

Length over all, 80 feet.
Breadth of beam, 23 feet.
Depth of hold, 8 feet.
Average draught, 7 feet.
Built at Sorel Shipyard in 1903.

The Tug 'Carmelia' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 17 feet.
Depth of hold, 9 feet.
Average draught, 8 feet.
Purchased in 1903.

COAL BARGES.

The Coal Barge 'No. 1' (wooden hull).

Length over all, 120 feet.
Breadth of beam, 24 feet.
Depth of hold, 10 feet.
Built at Sorel Shipyard in 1898.

The Coal Barge 'No. 2' (wooden hull).

Length over all, 125 feet.
Breadth of beam, 25 feet.
Depth of hold, 11 feet.
Built at Sorel Shipyard in 1900.

The Coal Barge 'No. 3' (wooden hull).

Length over all, 98 feet.
Breadth of beam, 28 feet.
Depth of hold, 12 feet.
Built at Sorel Shipyard in 1902.

The Coal Barge 'No. 4' (wooden hull).

Length over all, 98 feet.
Breadth of beam, 28 feet.
Depth of hold, 12 feet.
Built at Sorel Shipyard in 1903.

Stone-Lifter 'No. 2' (wooden hull).

Length over all, 80 feet.
Breadth of beam, 25 feet.
Depth of hold, 9·8 feet.
Rebuilt at Sorel Shipyard in 1897.

Stone-lifter 'No. 3' (wooden hull).

Length over all, 108 feet.
Breadth of beam, 34 feet.
Depth of hold, 14 feet.
Built at Sorel Shipyard in 1903.

Sounding Scow (wooden hull).

Length over all, 60 feet.
Breadth of beam, 25 feet.
Depth of hold, 6 feet.
Built at Sorel Shipyard in 1898.

Three Lodging Scows (wooden hulls).

Rebuilt from old dump scows and fitted out as lodging scows for crews of dredges and tugs of Ship Channel Fleet, at Sorel Shipyard in 1899, 1901, and 1903.

Two Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 97 feet.
Breadth of beam, 24·5 feet.
Depth of hold, 9 feet.
Capacity, 200 cubic yards.
Built at Sorel Shipyard in 1897.

Two Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 90 feet.
Breadth of beam, 18 feet.
Depth of hold, 7 feet.
Capacity, 150 cubic yards.
Built at Sorel Shipyard in 1898.

Four Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 97 feet.
Breadth of beam, 24 feet.
Depth of hold, 9 feet.
Capacity, 200 cubic yards.
Built at Sorel Shipyard in 1899 and 1901.

Five Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 98 feet.
Breadth of beam, 24 feet.
Depth of hold, 9·5 feet.
Capacity, 300 cubic yards.
Built at Sorel Shipyard, 2 in 1901, 3 in 1902.

Two Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 97 feet.
Breadth of beam, 24·5 feet.
Depth of hold, 9 feet.
Capacity, 300 cubic yards.
Built at Sorel Shipyard in 1903.

Two Small Flat Scows (wooden hulls) used at the Sorel Shipyard.

20 feet by 40 feet.
One of these with a derrick of 5 tons lifting capacity.

APPENDIX No. 4.

GENERAL SUMMARY of Expenditure for the Twelve Months to March 31, 1908.

Ocean and River Service—

Dominion steamers and icebreakers....	\$ 669,428 59
Examination of masters and mates	11,508 31
Reward for saving life..	31,642 41
Investigation into wrecks..	6,543 08
Schools of navigation..	7,378 01
Registration of shipping..	1,982 70
Removal of obstructions..	26,009 59
Tidal service..	30,977 40
Winter mail service..	11,019 79
Cattle inspection..	3,503 90
Wrecking plants..	30,000 00
Unforeseen expenses..	1,301 61
Naval militia..	9,078 17
Patrolling waters in northern portion of Canada..	34,706 39
New icebreaking steamer..	5,974 61
	<hr/> \$ 881,054 56

Public Works—Chargeable to Capital—

Ship channel..	\$ 761,916 84
Permanent piers in Lake St. Peter, &c....	116,063 87
Dredging Cap à la Roche..	75,000 00
Dredge <i>Beaujeu</i> ..	100,000 00
Spur line Sorel shipyard..	8,815 05
Montreal and Quebec signal service..	12,232 15
	<hr/> 1,074 027 91

Lighthouse and Coast Service—

Agencies, rents and contingencies..	\$ 29,359 26
Salaries and allowances to lightkeepers ..	285,050 14
Maintenance and repairs to lighthouses..	689,319 86
Parry Sound buoy depot..	41,983 93
Construction of lighthouses, &c..	715,572 91
“ apparatus..	801,636 83
Wireless stations..	114,986 60
Signal service..	9,350 28
Administration of pilotage..	31,087 22
Maintenance and repairs to wharfs, &c..	1,456 86
Maintenance and upkeep of dockyards..	30,656 22
Breaking ice, Lake Superior, &c..	37,053 32
Salaries of temporary clerks, &c..	16,728 99
Telephonic reporting stations below Mont- real..	7,820 68
Services of expert accountants..	13,066 34
Charter of steamer at Lime Kiln Crossing	6,650 00
Keeping lights on <i>Castle</i> and <i>Armenia</i> ..	3,680 00
	<hr/> 2,835,459 44

Carried forward.. 4,790,541 91

SESSIONAL PAPER No. 21

Brought forward. \$4,790,541 91

Scientific Institutions and Hydrographic Surveys.

Meteorological service.	\$ 122,572 86	
Magnetic observatory.	2,919 20	
Montreal observatory.	500 00	
Kingston observatory.	500 00	
Hydrographic surveys.	115,631 31	
On account new hydrographic steamer for British Columbia.	107,250 00	
		<hr/> 349,373 37
Marine hospitals.	\$ 59,957 92	
Shipwrecked and distressed seamen. . .	342 25	
Marine hospital at Yarmouth, N.S. . .	7,285 00	
		<hr/> 67,585 17
Steamboat inspection.		42,210 43
		<hr/>
Fisheries.		800,081 73
Civil government salaries, Marine and Fisheries.	103,916 53	
Contingencies of Marine and Fisheries. .	21,146 77	
		<hr/> 125,063 30
		<hr/>
Total expenditure Marine and Fisheries.		6,174,855 91

APPENDIX No. 5.
REVENUE.

STATEMENT of Sick Mariners' Dues collected for the Fiscal Year ended March 31, 1908.

Province of Quebec.

Gaspe	124 48
Montreal	6,332 00
Paspébiac	208 72
Perce	50 16
Quebec	6,819 34
Rimouski	181 54
St. Armand	25 84
St. Johns	1,696 54
Three Rivers	414 12
Total	15,852 74

Province of New Brunswick.

Bathurst	234 60
Campbellton	340 18
Chatham	555 05
Dalhousie	705 42
Moncton	623 64
Newcastle	534 68
Sackville	111 96
St. John	8,802 80
St. Stephen	145 88
Total	12,054 21

Province of Nova Scotia.

Amherst	517 80
Annapolis	139 64
Antigonish	0 54
Arichat	28 30
Baddeck	101 12
Barrington	28 02
Canso	144 22
Digby	209 58
Glace Bay	4 04
Halifax	12,156 98
Kentville	32 54
Liverpool	114 78
Lockeport	12 44
Lunenburg	712 66
North Sydney	1,659 18
Parrsboro	997 26
Pictou	287 74
Port Hawkesbury	194 28

Province of Nova Scotia—Continued.

Port Hood	42	10
Shelburne	81	70
Sydney	3,240	46
Weymouth	326	30
Windsor	1,039	10
Yarmouth	533	90
<hr/>		
Total	22,568	68

Nanaimo..	8,957	28
New Westminster..	72	76
Prince Rupert...	64	38
Vancouver..	1,644	14
Victoria..	8,124	92
Total....	\$18,863	48

Charlottetown..	324 16
Summerside..	79 08
	<hr/>
Total..	403 24
	<hr/>
Grand total..	69,742 35

The Collector of Customs, Halifax, N.S.—Signal station dues.. . . .	\$772 00
Total... . .	<hr/> \$772 00

Province of Ontario.		Province of British Columbia	
Name of port.	Amount.	Nome of port.	Amount.
Sault Ste.Marie..	\$45 68	Vancouver..	\$261 20
Total..	\$45 68	Victoria..	515 28
Province of Quebec.		Total..	
Montreal..	\$277 76		\$776 48
Quebec..	63 76	Yukon Territory.	
Total..	\$341 52	Dawson..	\$506 16
Province of Nova Scotia.		Total..	
Halifax..	\$1,156 00		\$506 16
Kentville..	419 12	Grand total..	
North Sydney..	92 40		\$3,337 36
Total..	\$1,667 52		

STATEMENT of Fisheries Revenue paid to the credit of the Receiver General of Canada
for the Fiscal Year ended March 31, 1908.

Provinces.	Amount.	Refunds.	Net Amount
	\$ cts.	\$ cts.	\$ cts.
Ontario.....	480 25	22 25	458 00
Quebec.....	6,185 63		6,185 63
Nova Scotia.....	1,487 28	16 83	4,470 45
New Brunswick.....	11,561 20	20 00	11,541 20
Prince Edward Island.....	3,013 85		3,013 85
Manitoba.....	3,529 05	2 00	3,527 05
Northwest Territories.....	200 00		200 00
Saskatchewan.....	958 60	10 00	948 60
Alberta.....	2 50		2 50
British Columbia.....	49,537 55	800 00	48,737 55
Hudson Bay.....	360 00		360 00
Franklin District.....	398 15		398 15
Yukon.....	274 00		274 00
Total.....	80,988 06	871 08	80,116 98
Licenses to United States fishing vessels.....	10,574 00	4 50	10,569 50
Net total.....			90,686 48

STATEMENT of Revenue of Marine and Fisheries Department for the Fiscal Year ended
March 31, 1908.

Service.	Amount.	Refunds.	Total.
	\$ cts.	\$ cts.	\$ cts.
Harbours, piers and wharfs.....	18,362 82	542 16	17,820 66
Dominion steamers—			
<i>Champlain</i>	6,546 11	7 80	
<i>Minto</i>	16,012 04	333 75	
<i>Stanley</i>	16,027 70	33 41	38,210 89
Examination, masters and mates.....	4,306 05		4,306 05
Fines and forfeitures, Marine.....	485 80		
" " Fisheries.....	427 90	50 00	863 70
Steamboat inspection fund.....	3,337 36		3,337 36
" engineers' certificates.....	1,522 50		1,522 50
Sick mariners fund.....	69,742 35	377 90	69,364 45
Signal station ..	772 00		772 00
Decayed pilots' fund.....	3,696 25		3,696 25
Pilots licenses.....	30 00		30 00
Marine register fees.....	50 96		50 96
Casual revenue, sundries—			
Marine.....	18,232 93		
Fisheries.....	19,727 86	594 84	37,365 95
Pilots' Expense account.....	250 00		250 00
Total.....	179,530 63	1,939 86	177,590 77

SESSIONAL PAPER No. 21

MINOR PUBLIC WORKS—REVENUE.

WHARVES, Piers and Harbours.

(Collected by Department of Marine and Fisheries.)

Ontario.		Quebec—Concluded.	
Name of wharfs.	Amount.	Name of wharfs.	Amount.
Barry's Bay.. .. .	\$ 183 99	St. Jean d'Orléans.. .. .	61 88
Blind River.. .. .	740 53	Ste. Cécile du Bic.. .. .	66 97
Bronte.. .. .	70 37	St. Laurent d'Orléans.. .. .	26 66
Bruce Mines.. .. .	147 04	St. Nicholas.. .. .	25 00
Burk's Falls.. .. .	13 75	St. Thomas de Montmagny.. .. .	9 34
Cockburn Island.. .. .	7 33	St. Zotique.. .. .	13 90
Echo Bay.. .. .	178 65	Sorel (harbour dues).. .. .	109 50
Goderich.. .. .	387 20	Tadousac.. .. .	81 59
Haileybury.. .. .	414 61	Total.. .. .	\$3,354 22
Hilton.. .. .	269 38	Less refunds.. .. .	542 16
Honora.. .. .	22 94	Net total.. .. .	2,812 06
Kingsville.. .. .	79 21		
L'Original.. .. .	199 64		
Leamington.. .. .	142 92		
North Bay.. .. .	5 90		
Midland.. .. .	46 02		
Oshawa.. .. .	16 99		
Pelee Island.. .. .	385 16		
Pembroke.. .. .	96 18		
Port Arthur (Harbour dues)....	38 00		
Port Findlay.. .. .	95 53		
Providence Bay.. .. .	122 06		
Richard's Landing.. .. .	177 75		
Rondeau.. .. .	25 60		
Rosseau.. .. .	127 91		
Sault Ste. Marie.. .. .	491 58		
Sheguiandah.. .. .	130 47		
Southampton.. .. .	271 29		
Summerstown.. .. .	13 00		
Thessalon.. .. .	274 53		
Wendover.. .. .	76 40		
Warton.. .. .	0 65		
Total.. .. .	\$5,252 58		
Quebec.		Nova Scotia.	
Anse aux Gascons.. .. .	\$ 73 77	Babin's Cove.. .. .	14 87
Anse St. Jean.. .. .	74 69	Barrington Passage.. .. .	159 68
Baie St. Paul (Cap aux Cor- beaux).. .. .	72 04	Battery Point.. .. .	1 98
Beauport.. .. .	20 00	Bayfield.. .. .	16 48
Berthier.. .. .	102 86	Bear Point.. .. .	3 92
Cap à l'Aigle.. .. .	41 00	Belliveau's Cove.. .. .	94 47
Carleton.. .. .	16 03	Black Point.. .. .	18 56
Chicoutimi.. .. .	331 44	Bridgewater (harbour dues).. ..	83 00
Coteau au Lac.. .. .	12 55	Brookland.. .. .	113 41
Coteau Landing.. .. .	8 55	Brule.. .. .	4 55
Desjardins.. .. .	5 00	Canada Creek.. .. .	2 35
Grand River.. .. .	182 29	Centreville.. .. .	99 21
Greece's Point.. .. .	.....	Chyuman's Brook.. .. .	0 78
Hudson.. .. .	15 30	Church Point.. .. .	33 94
Isle aux Grues.. .. .	1 20	Delap's Cove.. .. .	3 04
Lacolle.. .. .	21 56	D'Escousse (New).. .. .	77 66
Les Eboulements.. .. .	62 00	Digby.. .. .	2,624 89
L'Islet.. .. .	2 62	Drum Head.. .. .	14 55
Longueuil.. .. .	28 09	Freeport.. .. .	45 40
Magog.. .. .	43 67	Granville Centre.. .. .	41 54
Matane.. .. .	234 49	Halifax.. .. .	155 00
Murray Bay.. .. .	127 30	Hall's Harbour.. .. .	48 41
New Carlisle.. .. .	62 23	Hampton.. .. .	11 71
Paspebiac.. .. .	4 47	Harbourville.. .. .	26 32
Perce.. .. .	220 73	Horton Landing.. .. .	6 26
Peel Head.. .. .	69 03	International Pier (harbour dues)	55 00
Port Daniel.. .. .	61 43	Isaac's Harbour.. .. .	1 96
Port Lewis.. .. .	4 44	Jordan Bay.. .. .	16 51
Rimouski.. .. .	274 07	Louisbourg (harbour dues).. ..	128 50
Riviere du Loup.. .. .	373 19	Margaretsville.. .. .	99 57
St. Alphonse de Bagotville.. ..	127 74	Meteghan Cove.. .. .	63 72
St. Anicet.. .. .	21 60	Meteghan River.. .. .	16 06
St. Johns (harbour dues).. ..	264 00	Morden.. .. .	8 64
		Oak Point (Kingsport).. .. .	200 00
		Ogilvie.. .. .	20 05
		Parrsboro.. .. .	7 59
		Parker's Cove.. .. .	85 59
		Picketts.. .. .	75 55
		Port Dufferin.. .. .	28 38
		Port Hawkesbury.. .. .	328 21
		Port George.. .. .	57 38
		Port La Tour.. .. .	26 68
		Port Lorne.. .. .	52 52
		Port Mouton.. .. .	5 29
		Port Morien.. .. .	309 32
		Port Wade.. .. .	7 58
		Saulnierville.. .. .	74 57
		Swim's Point.. .. .	60 15
		Shag Harbour.. .. .	10 84
		Tiverton.. .. .	18 20
		Victoria.. .. .	3 25
		West Pubnico.. .. .	21 92
		White Head.. .. .	3 67
		Wolfeville.. .. .	30 40
		Total.. .. .	\$5,518 90

APPENDIX No. 6.

REPORT OF THE CHAIRMAN OF THE BOARD OF STEAMBOAT INSPECTION.

CHAIRMAN'S OFFICE, OTTAWA, June, 1908.

To the Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the annual report of the Steamboat Inspection Service for the fiscal year ending March 31, 1908.

The report contains the work of the service during the time stated, giving the number of steamboats inspected in the several divisions and their gross tonnage, with the amount of dues collected from steamers employed in the carriage of passengers between Canadian ports, but registered elsewhere than in Canada, with the fees received for engineers' examinations, the names of the candidates and grade of their certificate.

At the port of Montreal in addition to the steamers inspected, the ships' tackle and hoisting gear used for loading and unloading the vessels to the number of 418 were also inspected by the steamboat inspectors.

NUMBER of steam vesseds reported as known by the Inspectors of steamboats in the Dominion for the year ending March 31, 1908, also the number of steamers inspected but not registered in the Dominion for the same date.

Division.	Number of Dominion registered steamers.	Gross tonnage of Dominion registered steamers.	Number of steamers inspected but not registered in the Dominion.	Gross tonnage of steamers inspected but not registered in the Dominion.
Toronto	318	72,237	36	42,235
Collingwood	228	62,752	10	19,484
Kingston	167	28,777	16	1,247
Montreal	186	22,667	22	59,163
Sorel	96	26,861	.....	.....
Quebec	106	15,470	5	5,985
Nova Scotia.....	152	30,145	25	42,158
New Brunswick and Prince Edward Island..	165	24,768	10	16,372
British Columbia and Yukon Territory	302	64,711	29	48,530
Manitoba and Northwest Provinces.....	200	27,114	1	681
Total	1,920	375,622	154	226,855

NUMBER of Dominion registered steam vessels inspected and their gross tonnage, with amount of fees collected on account of Steamboat Inspection during the year ended March 31, 1908.

Division.	Number of Dominion registered steamers inspected.	Gross tonnage of Dominion registered steamers inspected.	Amount of fees collected on account of steamboat inspection.
			\$ cts.
Toronto.....	263	68,694	.....
Collingwood.....	188	56,522	45 68
Kingston.....	154	28,579	.....
Montreal.....	161	22,133	277 76
Sorel.....	96	26,861	.....
Quebec.....	106	15,470	63 76
Nova Scotia.....	138	29,611	1,506 88
New Brunswick and Prince Edward Island.....	170	28,705	.....
British Columbia and Yukon Territory.....	275	64,110	997 68
Manitoba and Northwest Provinces.....	139	27,114	.....
Engineers' Certificates.....			1,522 50
Total.....	1,690	367,799	4,414 26

BOARD MEETINGS.

June 20, 1907.—A meeting of the Board of Steamboat Inspection composed of the Boiler and Machinery Inspectors of Ontario, Quebec and the Maritime Provinces was convened at Montreal for the purpose of considering a further request of the Shipping Federation and their representatives pertaining to revising the rules as to the annual application of the hydraulic test to boilers so as to leave it discretionary with the inspector.

The full correspondence pertaining thereto was placed at the disposal of the board and after two days of consideration the unanimous opinion was, that it would not, under the various conditions as existing throughout the different localities, be prudent nor in the interest of public safety to make any change in the existing law regarding same.

January 23, 1908.—A meeting of a quorum of the board was convened at Sorel for the purpose of examining candidates to fill the vacancy of Boiler and Machinery Inspector caused by the demise of A. Rondeau. Mr. F. X. Hamelin of Sorel, having passed a qualifying examination was appointed to the position by Order-in-Council of March 9, 1908.

February 11, 1908.—A meeting of a quorum of the board was held at Ottawa for the examination of an Hull Inspector to fill the vacancy at Halifax caused by S. R. Hill resigning. Mr. Charles W. Sealey on passing a satisfactory examination was appointed to the position by Order-in-Council of March 11, 1908.

February 19, 1908.—Owing to the increase of work in the West Ontario Division, it became necessary to appoint an additional Hull inspector with headquarters at Collingwood. A meeting was convened at Ottawa to examine candidates for the position. Stephen D. Andrews, of Collingwood, passed satisfactorily and was appointed to the position by Order-in-Council of March 14, 1908.

SESSIONAL PAPER No. 21

Prosecutions with Penalties enforced for violation of Part VII. of the Canada Shipping Act, Steamboat Inspection.

October 29, 1907.—For violation of Section 659, Part VII. of the Canada Shipping Act, a penalty of \$50 was imposed on the steamer *Aberdeen* by the Collector of Customs of St. John, N.B., and bank draft No. 2041 for same was received by the department.

August 10, 1907.—A complaint was made against the owner of steamer *Viking* of Winnipeg for violation of Section 659 of the Canada Shipping Act, and on October 23 proceedings were taken before the magistrate at Selkirk to impose the penalty; the owner pleading guilty was fined \$50 and cost, for which a bank draft No. 156 was received by the department.

October 18, 1907.—A charge was laid before the magistrate at Port Arthur, Ont., against Mr. Peter Trembley of that place for carrying passengers on the tugboat *Beatrice M.*, said boat not having a certificate for that purpose. Mr. Trembley pleading guilty, a fine of \$100 and costs were imposed, for which a draft was received by the department, January 4, 1908.

CASUALTIES.

The following are the casualties reported from the several divisions as having occurred during the year ending March 31, 1908.

Toronto Division.

June 26, 1907.—Steamer *Batchewana*, of Sault Ste. Marie, was totally destroyed by fire at Copper Mine point, Lake Superior. Cause of fire from the explosion of a lamp. No casualties.

July 23, 1907.—The Crown sheet of boiler in tug *Gilbert* of Prescott collapsed and the fireman was scalded by the escaping steam and water, causing his death in a few days. The boiler was of the locomotive type and the lack of water was the cause of the accident.

August 6, 1907.—Steamer *Shamrock*, of Toronto, was burned at the wharf at Toronto, the cause of the fire being defective electric wiring in the waiting room on the wharf, which extended to the steamer.

September 21, 1907.—Steamer *Picton*, of Montreal, was destroyed by fire at the wharf at Toronto, one fireman and one of the passengers lost their lives; the cause of fire is unknown.

October 17, 1907.—The tug *T. F. Battle*, of St. Catharines, was destroyed by fire at Port Maitland; cause of fire unknown.

October 26, 1907.—The steamer *Lurline*, of Windsor, ran on a submerged crib at the entrance to Goderich harbour and became a total loss. The boiler and machinery were removed.

October 29, 1907.—Steamer *City of Grand Rapids*, of Sarnia, was destroyed by fire in Tobermora harbour, Lake Huron; cause of fire unknown.

November 23, 1907.—The tug *Escort*, of St. Catharines collided on Lake Ontario with the barge *Harrison*, in tow of steamer *Westmount*, and foundered; the captain, engineer and one other person were drowned. The vessel has since been raised.

Collingwood Division.

On the night of July 30, 1907, the tug *Esperanza*, of Toronto, caught fire and sank near Cape Croker, Ont. Cause of fire unknown. No casualties.

The passenger steamer *King Edward*, of St. Johns, Newfoundland, while entering the harbour of Thessalon, Ont., on August 25, 1907, struck a rock and sank. No casualties; the vessel has since been raised and repaired.

On August 27, 1907, the tug *Alert*, of Sault Ste. Marie, while towing in conjunction with the tug *W. H. Seymour* became so badly listed as to cause her to sink, drowning the captain, engineer and boom man. She has since been raised and repaired.

The tug *Metamora*, of Toronto, was totally destroyed by fire near Point aux Baril, Ont., on September 30, 1907, cause of fire unknown. No casualties.

October 3, 1907.—The tug *Philadelphia*, of Sault Ste. Marie, stranded at North Gros, Cap. Ont., becoming a total loss, and on October 15, the tug *Rheata* of Toronto was destroyed by fire near Midland, Ont. No casualties.

Kingston Division.

Casualty returns nil.

Montreal Division.

October 22, 1907.—Steamer *Rivière du Loup*, of Montreal, 199 tons, while lying in winter quarters at Lachine, took fire and was totally destroyed. Cause of fire unknown.

January 7, 1908.—Steamer *Booth*, of Ottawa, 347 tons, while hauled out on the ways for repairs at Wisawasa, Ont., took fire and was totally destroyed. Cause unknown.

Quebec Division.

April 15, 1907.—Steamer *Orion*, of Quebec, grounded at Calf Island, on Lake Ontario, was refloated on 23rd, brought to Quebec and condemned as a steamer. The machinery has been taken out and hull converted into a barge. The tug steamer *St. Etienne*, of Quebec, while lying at Murray Bay, caught fire and was partially burned, two lives being lost. Cause of fire unknown. The hull has been reconstructed.

November 7, 1907.—The paddle ferry steamer *Bourgenois*, of Quebec, sprang a leak in a gale of wind and sank alongside the wharf. No casualties.

Nova Scotia Division.

Casualty returns nil.

New Brunswick and Prince Edward Island Division.

March 23, 1907.—Tug *Waring* broke her cross-head and carried away low-pressure cylinder twin head, and piston rod. No one injured. Damage was repaired.

June 20, 1907.—Freight steamer *Westport*, on a voyage from Westport to St. John, broke two of the cross-head bolts, causing the piston to strike cylinder head, breaking it; the damage was repaired. No person injured.

June 21, 1907.—The passenger steamer *Crystal Stream*, while lying at her wharf, caught fire at midnight and was totally destroyed, four of the crew being suffocated in their berths. Cause of fire unknown. The coroner's inquest failed to develop how fire started.

November 5, 1907.—The passenger steamer *Springfield*, while lying at her wharf, caught fire from some unknown cause and was burned, becoming a total loss. No lives were lost.

SESSIONAL PAPER No. 21

Manitoba and Northwest Provinces Division.

June 7, 1907.—The steamer *Heather Belle*, of Winnipeg, while lying at anchor, caught fire in the night and was totally destroyed, no person being on board at the time. Cause of fire is unknown.

August 29, 1907.—The steamer *Viking*, of Winnipeg, while lying at the dock at Gimli, on Lake Winnipeg, was caught by a northeast gale and became a total wreck by pounding against the dock.

British Columbia and Yukon Division.

May 24, 1907.—Steamer *Thistle*, the yacht of Lieutenant Governor, when on a cruise, about noon the port bunkers suddenly burst out in flame, the vessel burnt up and eventually sank seven miles northwest from Pine Island lighthouse. Total loss. All passengers and crew were saved by the lifeboats.

July 6, 1907.—Steamer *Mount Royal*, on passage from Hazelton down Skeena river, in passing through Kitsilas canyon with a strong wind blowing was carried by current on Ring-bolt island and broken up. A total loss. Five of the crew were drowned, passengers were all saved.

September 27, 1907.—Steamer *Otter*, on voyage coal laden from Ladysmith, B.C., to Victoria, stranded on Danger reef, Trincomalee channel, she was afterwards released and brought to Victoria for repairs. Damages to stern, forefoot, keel and bilge planking.

October 17, 1907.—Steamer *Charmer*, when on a trip from Victoria to Vancouver, during a dense fog, collided with steamer *Tartar*, outward bound for China. Damage, bow stove in nearly to the collision bulkhead, after matters had been fitted she steamed back to Victoria where she was extensively repaired.

January 17, 1908.—Steamer *Vadso*, on voyage from Victoria to Port Simpson, via Vancouver, struck heavy on reef off Cape Lazo and remained fast. With the assistance of *Salvor* and other steamers, she was floated on January 23, and towed into Comox, when after getting leaks stopped, started for Victoria, where she was hauled out on marine railway and repaired. Damage, nine new plates with three others removed, made fair and replaced.

I am, sir, your obedient servant,

E. ADAMS,
Chairman, Board of Steamboat Inspection.

APPENDIX

STATEMENT of Expenditure by the Marine Department

	1868.	1869.	1870.	1871.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights—				
Above Montreal.....	40,561 28	42,306 69	46,289 05	44,054 01
Montreal District.....	23,053 56	25,762 54	21,669 49	22,453 52
Below Quebec.....	45,615 35	41,651 73	43,730 61	31,582 75
Nova Scotia.....	46,460 72	56,394 88	43,682 86	76,230 77
New Brunswick.....	20,488 00	23,893 00	27,485 14	20,542 29
Prince Edward Island.....				
British Columbia.....				
Construction—				
Above Montreal.....	3,136 15		2,976 83	8,770 55
Quebec.....	7,323 75	7,492 59	1,543 06	
Nova Scotia.....	22,041 42	6,905 80	18,967 23	10,948 31
New Brunswick.....			11,555 91	8,735 73
Prince Edward Island.....				
British Columbia.....				
Dominion steamers—				
Quebec.....	69,026 73	37,176 02	34,549 49	59,797 05
Nova Scotia.....	14,778 92	26,603 94	19,759 96	13,139 86
New Brunswick.....				
Prince Edward Island.....				
British Columbia.....				
Examination of masters and mates.....			908 12	1,407 66
Hudson Bay expedition.....				
Investigation into wrecks.....			140 00	
Marine Hospital, Quebec.....	19,977 36	19,221 45	21,618 73	19,823 18
Marine hospitals.....	1,070 86	15,615 71	15,652 62	15,728 93
Meteorological service.....	8,200 00	8,950 00	8,950 00	9,370 82
Registration of Canadian shipping.....				
Removal of obstructions.....			2,350 07	1,000 00
Rewards for saving life.....				
Signal service.....				
Steamboat inspection.....	7,106 93	7,999 00	7,396 96	8,321 00
Survey, Georgian Bay.....				
Water Police, Montreal.....	27,445 35	10,238 71	9,323 31	8,030 00
" Quebec.....		12,633 59	9,038 62	9,379 73
Civil Government.....	15,083 88	18,064 25	19,401 05	20,220 96
Steam communication—				
Between Quebec and Maritime Provinces.....				
Between Prince Edward Island and mainland.....				
Purchase of steamers to replace—				
<i>Glendon</i>				
<i>Lady Head</i>				
Winter mail service, Prince Edward Island.....				
Tidal observations.....				
Gratuities.....				
Survey, Burrard Inlet.....				
Export cattle trade.....				
	371,070 56	360,899 90	36,212 91	389,537 12

STATEMENT of Expenditure by the Marine Department

	1881.	1882.	1883.
	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights—			
Above Montreal	65,541 21	71,048 50	70,116 68
Montreal District	14,326 36	21,643 05	22,260 32
Below Quebec	89,781 29	91,098 66	102,784 99
Nova Scotia	128,918 59	137,846 15	150,793 17
New Brunswick	63,921 90	66,073 00	75,946 92
Prince Edward Island	12,997 36	16,985 72	17,907 27
British Columbia	17,570 72	17,803 00	18,349 06
Cape Race			
Construction—			
Above Montreal	14,180 02	13,581 00	9,782 27
Quebec	7,539 76	3,731 31	9,672 55
Nova Scotia	7,757 52	13,355 00	9,422 70
New Brunswick	4,578 52	2,253 80	1,022 57
Prince Edward Island	8,150 06	3,092 00	1,934 49
British Columbia	8,655 39	3,237 90	1,005 26
Queen's Printer			
Dominion steamers—			
Quebec	64,973 00	44,923 98	45,156 13
Nova Scotia	36,700 00	31,049 74	37,841 07
New Brunswick			
Prince Edward Island	15,139 95	23,911 97	19,680 00
British Columbia	11,788 09	8,504 61	25,484 00
Department			
Examination of masters and mates	3,888 41	[3,981 00	4,021 20
Hudson's Bay expedition			
Investigation into wrecks	310 48	863 19	875 64
Marine Hospital, Quebec	19,964 33	19,938 12	19,998 53
Marine hospitals	32,218 94	33,162 45	29,880 78
Meteorological service	46,163 54	47,464 07	51,990 25
Registration of Canadian shipping	607 43	2,013 28	168 84
Removal of obstructions	150 00	1,116 51	35 80
Rewards for saving life	1,806 13	2,212 00	2,534 00
Signal service			3,365 33
Steamboat inspection	12,211 65	14,835 00	16,209 00
Hydrographic surveys			77 81
Water Police, Montreal	21,953 26	21,994 74	15,798 24
Water Police, Quebec	13,497 81	20,221 82	22,520 41
Civil Government	36,447 50	36,789 46	37,988 39
Steam communication—			
Between Quebec and Maritime Provinces			
Between Prince Edward Island and mainland			
Repairs to wharfs			
Purchase of steamers to replace—			
Stanley			399 55
Glendon			
Lady Head			
Winter mail service, Prince Edward Island			
Tidal observations			
Gratuities			
Survey, Burrard Inlet			
Export cattle trade			
Survey, Bay of Quinté			
Relief of distressed Canadians			
Manning ships			
Widow of late A. Warren			
McDonald Bros			
Parliamentary returns			
Investigating effect of Chicago drainage canal			
John McDonald			
Longitude, Montreal			
Marine biological station			
	761,730 62	774,831 53	825,010 82

from Confederation to March 31, 1908—*Continued.*

21—10½

STATEMENT of Expeniture by the Marine Department

	1892.	1893.	1894.	1895.	1896.	1897.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights—						
Above Montreal	87,033 61	87,598 15	78,090 69	82,541 16	82,256 28	80,961 06
Montreal District						
Below Quebec	116,531 27	120,404 19	124,348 80	124,763 81	124,143 66	126,186 00
Nova Scotia	148,815 26	150,445 26	137,339 73	140,977 53	123,234 65	124,671 19
New Brunswick	66,886 69	71,079 46	59,917 96	69,654 46	63,018 64	56,871 02
Prince Edward Island ..	17,069 98	16,819 64	15,569 39	17,976 67	17,988 15	16,429 23
British Columbia	26,858 68	24,413 27	27,240 77	21,734 18	24,770 44	25,679 52
General Account						
Construction—						
Above Montreal	21,704 05	8,766 62	12,581 15	2,699 40	11,993 84	9,527 94
Quebec	809 27	10,097 18	4,743 13	3,004 14	3,300 30	296 26
Nova Scotia	1,965 16	4,381 24	3,104 77	4,737 03	1,842 94	61 71
New Brunswick	1,845 35	1,271 15	115 45	1,597 80	200 00	1 60
Prince Edward Island ..	1 56	2,958 61	1,604 00			452 90
British Columbia	9,478 81		6,356 43	180 83	225 50	569 99
Lake St. Peter						
New Dredge						
Dominion Steamers—						
Quebec	145,899 61	163,097 46	178,183 97	169,661 64	145,315 28	136,940 11
Nova Scotia						
New Brunswick ..						
Prince Edward Island ..						
British Columbia						
Naval Schools						
Examinations of masters						
and mates	6,363 88	4,116 99	3,745 33	2,757 29	4,062 82	3,536 29
Hudson's Bay expedition ..						19,091 32
Investigation into wrecks ..	603 21	643 49	850 81	351 15	483 98	565 25
Lighthouse depot, Georg-						
ian Bay						
Marine Hospitals	34,106 83	35,757 07	38,403 94	38,589 05	36,682 96	37,984 71
Meteorological service	67,138 06	61,165 60	66,440 96	64,588 34	66,600 29	67,397 71
Registration of Can. ship-						
ping	462 59	1,476 19	394 00	207 40	517 60	531 55
Removal of obstructions ..	2,878 68	1,554 53	202 02	2,217 36	456 38	631 86
Rewards for saving life	6,398 93	7,432 64	8,014 67	6,591 34	8,004 38	5,955 19
Signal service	5,014 42	5,040 58	4,668 93	5,311 54	5,338 76	5,986 12
Steamboat inspection	22,736 59	24,386 95	25,961 36	26,385 88	26,321 27	26,837 83
Hydrographic surveys	16,451 10	17,542 11	31,461 76	12,653 28	15,099 63	12,352 99
Ship channel	6,161 60	5,436 23				
Civil Government	43,195 31	56,477 23	54,988 88	71,373 82		74,801 37
Repairs to wharfs		84 90	1,007 67	824 38	2,644 69	1,795 56
Purchase of steamer <i>Minto</i> ..						
Winter mail service, P.E.I. ..	3,309 44	4,376 96	6,497 03	6,138 18	7,779 69	21,931 05
Total observations	711 59	5,099 17	10,172 61	11,507 24	9,627 45	13,166 20
Gratuities			3,261 32			
Survey, Burrard Inlet	2,580 45					
Export cattle trade ..	1,411 57	1,711 73	1,350 83	2,268 74	2,887 24	
Survey, Bay of Quinté		2,085 45				
Relief of distressed Cana-				7 30		
dians						
Parliamentary returns					291 08	
Investigation effect Chica-						
go drain canal					2,500 00	
John Macdonald					200 00	
Unforeseen expenses						
Marine biological station ..						
New life-saving station,						
Long Point						
Salaries, temporary clerks ..						
Steamer to replace <i>Bayfield</i> ..						
Observatory, Sulphur Mtn. ..						
Charles Morrison						
Montreal Pilotage Com-						
missioners						
Mortreal wireless tele-						
graphy						
Purchase land for wharf at						
Halifax, N.S.						

SESSIONAL PAPER No. 21

from Confederation to March 31, 1908—*Continued.*

1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
87,841 22	92,751 23	82,810 92	93,708 16	92,195 52	117,896 37	154,194 26	244,960 38
.....	136,134 79	122,112 42	132,147 88	154,839 06	148,302 34	170,554 10	273,865 74
116,279 88	.....	.....	.....	.....	.....	.....	.....
126,386 00	65,072 35	122,414 86	142,359 01	149,572 14	142,725 69	164,339 92	204,157 27
67,369 98	128,674 15	52,491 93	65,247 80	69,133 51	73,410 65	79,464 50	121,289 44
18,112 93	20,569 81	42,878 40	28,031 85	24,223 73	25,575 33	25,603 09	36,760 32
26,862 03	29,530 20	33,545 95	31,938 25	35,119 03	35,758 43	39,068 34	55,976 59
.....	.....	.....	.....	46 75	.....	.....	.....
6,867 69	3,729 62	7,094 64	12,499 99	158,714 09	399,487 73	540,675 07	1,447,202 77
3,649 90	37,838 80	40,319 03	17,060 13				
4,067 99	3,123 16	4,884 22	12,832 69				
1,423 34	91 49	.....	266 34				
1,409 60	616 96	5,586 91	922 00				
6,414 19	19,305 60	.....	4,160 74				
.....	.....	.....	660 03	.....	.....	.....	93,938 90
.....	.....	.....	.....	.....	.....	.....	10,745 36
117,644 39	145,270 75	180,430 65	195,484 75	452,526 92	369,813 97	306,171 01	475,907 20
.....	.....	.....	.....	.....	.....	6,106 54	3,123 24
3,335 40	3,568 26	3,750 69	3,730 25	3,305 59	4,968 36	7,761 17	5,884 74
27,050 66	.....	.....	.....	.....	.....	178,638 94	236,469 00
312 77	982 17	773 06	1,022 65	1,824 55	1,367 45	3,570 28	5,111 34
.....	.....	.....	.....	.....	.....	.....	12,000 00
38,162 56	37,353 29	37,743 30	36,008 75	51,827 13	48,750 15	50,301 78	51,731 56
64,135 71	73,148 05	76,692 42	74,082 76	80,147 46	87,293 00	90,306 99	98,820 21
818 33	966 48	266 43	546 62	607 23	417 25	1,203 56	1,215 14
704 17	745 49	252 19	1,000 00	1,325 25	382 98	752 60	9,521 68
5,081 40	7,049 09	7,007 97	8,519 92	8,278 55	9,306 25	11,763 12	9,592 91
4,993 88	6,067 90	5,906 83	8,950 17	6,452 56	6,863 75	7,740 01	8,755 44
26,342 29	28,035 49	72,965 72	29,247 59	27,493 80	30,172 09	33,723 12	50,187 75
15,306 66	13,664 97	12,600 98	16,170 20	25,488 64	35,243 97	41,366 95	103,926 98
.....	.....	.....	.....	.....	.....	.....	511,171 41
74,644 05	72,833 97	63,331 61	68,776 95	70,246 32	84,442 53	91,985 07	102,735 31
1,618 97	.....	697 87	1,261 06	2,824 28	1,721 91	1,300 89	1,590 61
.....	144,365 29	41,951 88	.....	.....	.....	.....	.....
9,575 31	8,439 70	1,503 70	2,093 93	8,835 86	6,211 28	8,912 57	10,984 74
3,081 45	5,186 35	4,372 18	7,060 20	8,925 33	14,520 00	21,871 71	23,802 24
.....	.....	.....	.....	136 85	1,050 00	1,210 00	2,340 00
2,499 80	2,737 85	2,762 24	2,746 84	3,321 23	3,026 25	3,504 43	3,300 35
.....
.....	.....	.....	133 32	.....	95 10	.....	269 20
.....	.....	.....	1,659 14	.....	.....	.....	.....
.....	.....	3,452 21	2 630 62	3,490 29	4,822 78	3,977 63	2,953 19
.....	5,709 10	739 61	1,990 58	1,998 85	2,000 00	2,996 54	2,001 69
.....	.....	.....	.....	1,780 52	.....	.....	.....
.....	.....	.....	.....	2,967 35	6,945 96	11,448 10	15,881 35
.....	.....	.....	.....	50,000 00	.....	.....	.....
.....	.....	.....	.....	55 00	3,167 62	.....	.....
.....	.....	.....	.....	223 00	.....	.....	.....
.....	.....	.....	.....	3,691 69	.....	.....	.....
.....	.....	.....	.....	.....	1,745 23	2,050 00	10,776 51
.....	.....	.....	.....	.....	3,528 25	18,847 31	40,785 11

STATEMENT of Expeniture by the Marine Department

	1892.	1893.	1894.	1895.	1896.	1897.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Purchase land for wharf at Charlottetown, P.E.I.						
Schools for navigation						
Naval militia						
Cattle inspection						
Wrecking plant						
Ice-beaking steamers						
S. Shaw						
Salaries, lightkeepers						
Agencies, rents, &c.						
Maintenance and repairs						
Repairs to lightships						
Construction and apparatus						
	861,426 80	898,720 03	905,654 34	895,828 28	793,634 49	867,772 90

SESSIONAL PAPER No. 21
from Confederation to March 31, 1908—Continued.

1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
.....	15,119 11	.....
.....	13,000 00	.....
.....	5,036 29	.....
.....	9,135 87	.....
.....	3,335 52	.....
.....	25,000 00	.....
.....	164,414 93	.....
.....	39 33	.....
.....	242,403 64	.....
.....	29,739 50	.....
.....	531,920 43	.....
.....	23,560 00	.....
.....	1,605,778 59	.....
856,192 50	1,102,601 90	982,561 97	1,029,925 32	1,501,618 88	1,671,494 77	2,150,940 31	4,747,722 81

8-9 EDWARD VII., A. 1909,

STATEMENT of Expenditure by Marine Department from Confederation to March 31,
1908—Continued.

	1906.
	\$ cts.
Dominion steamers—	
Quebec.....	587,885 89
Nova Scotia.....	
New Brunswick.....	
Prince Edward Island.....	
British Columbia.....	
Examinations of masters and mates.....	7,068 15
Hudson's Bay expedition.....	132,707 52
Investigation into wrecks.....	7,476 07
Marine hospitals.....	50,120 42
Meteorological service.....	99,719 52
Registration of Canadian shipping.....	1,800 00
Removal of obstructions.....	4,967 15
Rewards for saving life.....	11,991 43
Signal service.....	8,184 39
Steamboat inspection.....	37,590 22
Hydrographic surveys.....	120,359 68
Ship channel.....	587,957 51
Repairs to wharfs.....	2,960 47
Winter mail service, P.E.I.....	16,680 58
Total observations.....	28,047 77
Unforeseen expenses.....	3,765 17
Marine biological station.....	2,914 03
Salaries, temporary clerks.....	19,947 01
Purchase land for wharf at Halifax, N.S.....	88,033 87
Schools for navigation.....	5,036 29
Naval militia.....	9,135 87
Cattle inspection.....	3,335 52
Wrecking plant.....	25,000 00
Ice-breaking steamers.....	161,414 93
S. Shaw.....	39 33
Salaries, lightkeepers.....	242,403 64
Agencies, rents, &c.....	29,739 50
Maintenance and repairs.....	531,920 43
Repairs to lightships.....	23,560 00
Construction and apparatus.....	1,605,778 59
Submarine signal apparatus.....	50,547 60
Administration of pilotage.....	12,066 42
Parry Sound Buoy Depot.....	11,711 17
Compensation re explosion of gas buoys.....	38,686 49
Water system, Patridge Island.....	2,957 37
Observatory, Toronto.....	2,872 96
" Montreal.....	500 00
Hydrogr. str., Atlantic coast.....	45,500 00
" Pacific coast.....	370 01
New dredge, No. 15.....	150,001 32
" Galveston.....	159,847 89
Shipwrecked and distressed seamen.....	598 91
Parliamentary returns.....	485 11
Gratuities.....	616 66
Civil Government, salaries.....	88,453 31
" " contingencies.....	19,506 45
	5,066,252 66

SESSIONAL PAPER No. 21

STATEMENT of Expenditure by Marine Department from Confederation to March 31,
1908—*Coontinued.*

EXPENDITURE for the Nine Months to March 31, 1907.

Service.	Amount.	Total. 1907.
	\$ cts.	\$ cts.
Ocean and river—		
Dominion steamers.....	447,139 03	
Examination of masters and mates.....	5,934 16	
Rewards for saving life—life-boats, &c.	9,025 89	
Investigations into wrecks.....	8,662 16	
Schools for navigation.....	4,891 69	
Registration of Canadian shipping.....	1,506 53	
Removal of obstructions in navigable waters ..	7,377 20	
Tidal service.....	19,214 79	
Winter mail service.....	11,998 01	
Marine biological stations.....	1,537 04	
Cattle inspection.....	2,743 80	
Wrecking plant	15,000 00	
Hudson's Bay expedition.....	33,871 95	
" " patrol boat	29,977 91	
Ice-breaking steamer <i>Lady Grey</i>	66,293 51	
Quebec Coal Company's claim.....	1,000 00	
Arresting two sailors of the <i>Hector</i>	148 75	
H. M. Stewart, clothing destroyed by fire.....	9,078 17	
Naval Militia.....	5,974 61	
New icebreaker.....	171 00	
Unforeseen expenses.....	3,213 62	
		669,717 04
Lighthouse and coast—		
Salaries and allowances of lightkeepers.....	197,235 03	
Agencies, rents and contingencies.....	22,076 58	
Maintenance and repairs to lighthouses	499,597 86	
Construction of lighthouses and apparatus..	1,159,906 40	
Breaking ice in Thunder Bay.....	21,303 85	
Signal service.....	6,859 68	
Marconi stations ..	53,532 19	
Pilotage.....	21,490 73	
Repairs to wharfs.....	1,747 15	
Salaries, temporary clerks.....	14,477 16	
Georgian Bay and Parry Sound buoys.....	4,500 43	
		2,002,727 06
Scientific institutions and hydrographic surveys--		
Observatory, Toronto.....	2,313 67	
" Kingston.....	375 00	
" Montreal.....	375 00	
Meteorological service.....	75,163 20	
Hydrographic surveys	84,435 32	
		162,662 19
Dredge No. 15.....		150,000 00
Cap à la Roche		1,347 87
<i>Galveston</i>		50,089 77
Ship channel.....		419,398 19
Compensation to L. O'Brien.....		2,200 00
Marine hospitals.....	37,362 11	
Shipwrecked and distressed seamen.....	793 56	
		38,155 67
Steamboat inspection... ..		32,459 55
Returns for Parliament.....	634 36	
K. Falconer, reorganizing system of bookkeeping.....	25,000 00	
		25,634 36
Civil Government, Salaries.....	68,995 81	
" " Contingencies.....	14,182 31	
		83,178 12
Total, Marine Branch.....		3,637,569 82
" Fisheries Branch		534,669 90
Fishing bounty.. ..		159,015 75
		4,331,255 47

8-9 EDWARD VII., A. 1909

STATEMENT of Expenditure by Marine Department from Confederation to March 31, 1908—*Continued.*

EXPENDITURE for the fiscal year ended March 31, 1908.

<i>Ocean and River Service—</i>	<i>Amount.</i>
Dominion steamers and ice-breakers.....	\$669,428 59
Examination of masters and mates.. ..	11,508 31
Rewards for saving life.....	31,642 41
Investigations into wrecks....	6,543 08
Schools of navigation.. ..	7,378 01
Registration of shipping.. ..	1,982 70
Removal of obstructions....	26,009 59
Tidal service.. ..	30,977 40
Winter mail service.. ..	11,019 79
Cattle inspection.. ..	3,503 90
Wrecking plants.. ..	30,000 00
Unforeseen expenses.....	1,301 61
Naval militia.....	9,078 17
Patrolling waters in northern portion of Canada.. ..	34,706 39
New ice-breaking steamer.. ..	5,974 61
	<hr/> \$881,054 56

Public Works—Chargeable to Capital—

Ship channel.. ..	\$761,916 84
Permanent piers in Lake St. Peter, &c...	116,063 87
Dredging, Cap à la Roche.....	75,000 00
Dredge <i>Beaujeu</i>	100,000 00
Spur line, Sorel shipyard....	8,815 05
Montreal & Quebec Signal Service.. ..	12,232 15
	<hr/> \$1,074,027 91

Lighthouse and Coast Service—

Agencies, rents and contingencies.. ..	29,359 26
Salaries and allowances to lightkeepers....	285,050 14
Maintenance and repairs to lighthouses..	689,319 86
Parry Sound buoy depot.. ..	41,983 93
Construction of lighthouses, &c... ..	715,572 91
Construction of apparatus....	801,636 83
Wireless stations.....	114,986 60
Signal service.....	9,350 28
Administration of pilotage.. ..	31,087 22
Maintenance and repairs to wharfs, &c...	1,456 86
Maintenance and upkeep of dock yards..	30,656 22
Breaking ice, Lake Superior, &c.....	37,053 32
Salaries of temporary clerks, &c.. ..	16,728 99
Telephone stations.. ..	
Telephonic reporting stations below Mon- treal.. ..	7,820 68
Service of expert accountants.. ..	13,066 34
Charter of steamer, Lime Kiln Crossing..	6,650 00
Keeping lights on 'Castle and 'Armenia'	3,680 00
	<hr/> 2,835,459 44

SESSIONAL PAPER No. 21

STATEMENT of Expenditure by Marine Department from Confederation to March 31,
1908—*Concluded.*EXPENDITURE for the fiscal year ended March 31, 1908—*Concluded.**Scientific Institutions and Hydrographic
Surveys—*

Meteorological service..	\$122,572 86	
Megnetic observatory..	2,919 20	
Montreal observatory	500 00	
Kingston observatory	500 00	
Hydrographic surveys	115,631 31	
On account new hydrographic steamer, British Columbia..	107,250 00	
	<hr/>	\$ 349,373 37
Marine hospitals..	59,957 92	
Shipwrecked and distressed seamen	342 25	
Marine hospital at Yarmouth, N.S.	7,285 00	
	<hr/>	67,585 17
Steamboat inspection..		42,210 43
<i>Fisheries</i>		800,081 73
Civil Government Salaries, Marine and Fisheries	103,916 53	
Contingencies of Marine and Fisheries ..	21,146 77	
	<hr/>	125,063 30
	<hr/>	
Total expenditure Marine and Fisheries		6,174,855 91
Fishing bounty		156,114 50

APPENDIX NO. 8.

METEOROLOGICAL SERVICE.

METEOROLOGICAL OFFICE,

TORONTO, June 1908.

Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the thirty-seventh annual report of the Meteorological Service, this report being for the fiscal year ended March 31, 1908, with appendices *A* and *B* reports of St. John and Quebec observatories.

The number of persons in receipt of pay from the Meteorological Service on March 31, for the various duties performed in connection therewith was 224. Of this number 26 were employed in the Central office, and with a few at outside stations, devote their whole time to the work of the service; others are occupied in observing during only a portion of each day, and others again are employed only to attend to the display of storm signals when notified.

There are now in the Dominion 434 stations from which observers report to the Central office. At 39 of these stations, distributed at nearly equal intervals throughout Canada where the observers are paid salaries, three or more observations are taken daily, and those taken in the morning and evening are reported by telegraph to Toronto. At 49 other points observers also receive remuneration for a more or less extended series of observations. Special observations during the summer months are collected at Winnipeg by telegraph from twenty-four stations in the western provinces and together with other information sent from Toronto are telegraphed at the same time to a large number of places in these provinces; for this bulletin service remuneration is allowed. Eighty-nine persons are paid for attending to the display of storm signals; and for the time service and special telegraph service seven persons are employed.

Since the issue of my last report the following stations have commenced reporting :—

BRITISH COLUMBIA.

- Class III.—Swanson Bay.
- “ II.—Summerland.
- “ II.—Crawford Bay.
- “ III.—Hornby.

ALBERTA.

- Class III.—Kimball.
- “ II and S.—Lacombe. Experimental Farm.
- “ II.—Eckville.
- “ II.—Harmattan.
- “ II.—Daysland.
- “ II and S.—Lethbridge. Experimental Farm.
- “ II.—Pembina.

SESSIONAL PAPER No. 21

SASKATCHEWAN.

Class II.—Meota.
 “ II.—Waseca.
 “ III.—Arcola.
 “ II.—Kamsack.
 “ ?—Qu'Appelle.
 “ II.—East End.
 “ II.—Haddington.
 “ II.—Drumague.
 “ II.—Esterhazy.

ONTARIO.

Class II.—Judge.
 “ II.—Ronville.

QUEBEC.

Class II.—D'Israeli.

PRINCE EDWARD ISLAND.

Class II.—Hillsborough.

PEACE RIVER DISTRICT, ALTA.

Class II.—Shaftesbury.
 “ II.—Peace River Landing.

The following stations have for various reasons ceased reporting:—

Barrie, Ont.
 Wisa, Ont.
 Pelee Island, Ont.
 Kitamaat, B.C.
 Wolfville, N.S.
 Pincher Creek, Alta.
 Leavings, Alta.
 Stirling, Alta.
 Clover Bar, Alta.
 Lemberg, Sask.
 Heward, Sask.

CENTRAL OFFICE.

During the larger portion of the past fiscal year the work of the central office was carried on under most adverse circumstances, the encroachments of the new university buildings continuing until by the winter it was found impossible to remain in the old observatory building without seriously impairing the value of the service. It was therefore decided to remove the offices to temporary quarters in two houses owned by the university and situated on Spadina avenue which have since been found to meet our requirements fairly well. The clocks, transit instrument and standard barometer and various other instruments have been left in the transit house, a small stone building near to the observatory, which together with the workshop will be left standing until such time as the new meteorological building shall have been completed.

Since my last report the staff has been brought up to the old strength numerically by the appointment of Mr. A. J. Connor, but such addition by no means compensates for the loss by death of the late Mr. W. A. Steuart who by a thorough knowledge of the statistical work of the office and an assiduous attention to duty, performed an amazing amount of work. It will be necessary again this coming summer to employ several temporary clerks to assist in preparing the Annual Climatological Report of the past civil year.

Number of predictions and percentage of fulfilment in each district, in each month and in the Fiscal Year 1907-1908.

Month.	LOWER LAKE REGION.					OTTAWA VALLEY.					UPPER ST. LAWRENCE.					LOWER ST. LAWRENCE.					GULF.				
	Verified.					Verified.					Verified.					Verified.					Verified.				
	Number of Predictions.	Number fully.	Number partly.	Number not.	Percentage.	Number of Predictions.	Number fully.	Number partly.	Number not.	Percentage.	Number of Predictions.	Number fully.	Number partly.	Number not.	Percentage.	Number of Predictions.	Number fully.	Number partly.	Number not.	Percentage.					
1907.																									
April.	125	93	26	6	84.8	111	87	15	9	85.1	111	86	17	8	85.1	107	78	14	15	79.4					
May.	128	100	21	7	86.3	110	89	16	5	88.2	109	89	16	4	89.0	121	98	19	4	88.8					
June.	116	101	11	1	94.4	87	79	6	2	94.3	87	81	5	1	96.0	102	87	9	6	89.7					
July.	133	114	15	4	91.4	118	96	14	8	87.4	117	104	6	7	91.5	109	81	16	12	81.7					
August.	138	110	25	3	88.8	115	98	15	3	90.9	115	95	17	3	90.0	117	89	22	6	85.5					
September.	125	100	21	4	88.4	121	92	23	6	85.5	120	93	23	4	87.1	120	92	22	6	85.8					
October.	127	93	28	6	84.3	114	92	20	2	89.5	114	93	19	2	89.9	118	90	20	8	84.7					
November.	126	82	33	11	78.2	120	86	29	5	83.7	119	89	26	4	85.7	116	82	22	12	80.2					
December.	119	99	18	2	90.8	110	93	15	2	91.4	110	97	12	1	93.6	113	87	17	9	84.5					
1908.																									
January.	126	101	20	5	88.1	108	81	26	1	87.0	108	85	22	1	88.9	115	84	23	8	83.0					
February.	102	85	13	4	89.7	102	80	14	8	85.3	102	82	14	6	87.3	98	82	10	6	88.8					
March.	116	79	19	18	76.3	104	76	20	8	82.7	104	76	21	7	83.2	99	72	13	14	79.3					
Totals	1481	1160	250	71	86.8	1320	1048	213	59	87.5	1316	1070	198	48	88.8	1335	1022	207	106	84.3					
																	1033	210	102	84.6					

NUMBER of predictions and percentage of fulfilment in each district, in each month and in the Fiscal Year 1907-1908.

MONTH.	MARITIME PROVINCES, W.						MARITIME PROVINCES, E.						TOTALS.			
	Number of predictions.	Verified.				Number of predictions.	Verified.				Number of predictions.	Verified.			Percentage.	
		Number fully.	Number partly.	Number not.	Percentage.		Number fully.	Number partly.	Number not.	Percentage.						
1907.																
April.....	109	76	26	81.6	109	76	25	81.2	1,265	931	226	108	82.5			
May.....	119	94	18	86.5	119	88	24	84.0	1,325	1,056	195	74	87.0			
June.....	105	93	10	93.3	105	90	10	90.5	1,137	987	104	46	91.4			
July.....	111	82	23	84.2	109	77	26	82.6	1,316	1,036	205	75	86.5			
August.....	129	102	23	88.0	129	98	28	86.8	1,396	1,099	252	45	87.7			
September.....	130	96	25	83.5	130	95	22	81.5	1,346	1,029	238	79	85.3			
October.....	122	101	11	87.3	122	92	21	84.0	1,327	1,021	222	84	85.3			
November.....	116	82	25	81.5	116	77	30	79.3	1,299	907	292	100	81.1			
December.....	115	81	26	81.7	116	89	22	86.2	1,249	1,019	177	53	88.7			
1908.																
January.	129	100	25	87.2	128	100	24	87.5	1,298	1,014	235	49	87.2			
February.....	117	91	20	86.3	117	91	20	86.3	1,147	925	165	57	87.8			
March.....	118	73	27	74.2	117	76	26	76.1	1,208	848	214	146	79.1			
Totals	1,420	1,071	259	84.5	1,417	1,049	278	83.8	15,313	11,872	2,525	916	85.77			

SESSIONAL PAPER No. 21

NUMBER of predictions and percentage of fulfilment in each district, in each month for British Columbia, in the Fiscal year 1907-08.

MONTH.	VICTORIA AND VICINITY.					LOWER MAINLAND.					TOTALS.					
	Verified.					Verified.					Verified.					
	Number of Predictions.	Number fully.			Percentage.	Number of Predictions.	Number fully.			Percentage.	Number of Predictions.	Number fully.			Percentage.	
		Number fully.	Number partly.	Number not.			Number fully.	Number partly.	Number not.			Number fully.	Number partly.	Number not.		
1907.	April.....	198	80	9	19	197	86	4	7	90.7	795	166	73	16	88.5	
	May.....	135	113	7	15	127	101	11	15	85.1	262	214	18	30	85.1	
	June.....	126	108	4	14	113	92	11	10	84.8	239	200	15	24	86.8	
	July.....	143	129	4	10	140	129	2	9	92.9	283	258	6	19	92.9	
	August.....	127	100	9	18	119	86	12	21	77.3	246	186	21	39	79.9	
	September.....	92	78	4	10	90	76	4	10	86.7	182	154	8	20	86.8	
	October.....	110	83	7	20	106	91	3	12	87.3	216	174	10	32	83.9	
	November.....	100	84	5	11	97	82	7	8	88.1	197	166	12	19	87.3	
	December.....	107	69	17	21	100	72	9	19	76.5	207	141	26	40	74.0	
	1908.	January.....	106	80	7	19	100	76	6	18	79.0	206	156	13	37	78.9
February.....		105	80	12	13	105	88	5	12	86.2	210	168	17	25	84.0	
March.....		106	76	12	18	101	83	9	9	86.6	207	159	21	27	81.8	
Totals.....		1,355	1,080	97	178	1,295	1,062	83	150	85.2	2,650	2,142	180	328	84.2	

8-9 EDWARD VII., A. 1909

Throughout the year bi-daily reports have been received by telegraph from 36 stations in the Dominion and from a large number of stations in the United States, the data thus obtained being used for the preparation of the weather charts on which the forecasts are based. Forecasts have been issued twice each day, at 10 a.m. and 10 p.m., the first issue usually covering the current day and the following day up to 8 p.m., and the second, the 24 hours beginning at 8 a.m. the following day. A table giving the percentage of verification of the 10 p.m. issue is given herewith.

Warnings of expected storms have been despatched to signal stations whenever it has been considered that occasion required it, and of the 2,306 warnings issued 2,165 or 93.9 per cent were verified.

During the winter season the central office has, as in past years, been constantly requested by the shippers of perishable goods to furnish special temperature forecasts and the value of such forecasts may be duly estimated from the ever increasing number of applications for them, clearly indicating that those interested, recognize their usefulness. Special forecasts of approaching snow and drift storms have during the winter been issued to the various Canadian railways—and appear to have been duly appreciated by the corporations concerned.

In July a very decided improvement was made in the publication of the daily weather map, the old system of manifolding by means of the mimeograph being discontinued—a combination of a chalk plate process and printing being substituted with most satisfactory results. The map as now issued is most creditable. Up to the middle of March the printing was done by the University Press, but has since been done in the Meteorological office where a printing press has been installed and a young printer employed permanently.

The publications of the Meteorological Service have been continued with regularity and, as indicated in my last report, have, in consequence of the largely increased number of reporting stations, entailed an amount of clerical work beyond the capacity of the ordinary office staff and it has been necessary to employ several temporary clerks for a few months. The annual climatical report for 1905 issued during the year is a volume of over 426 pages; it contains pages shewing the percentage of verification of meteorological forecasts; a table shewing the depth of snow on the ground on the last day of each month in the various parts of the Dominion; a table of phenological phenomena; a general summary of the weather of 1905; summaries and mean values of observations made at all Canadian meteorological stations during the year; results of magnetic observations made at Agincourt observatory, and finally, a paper on the Seiche on the great lakes—and a paper on Atmospheric Electricity by Professor W. J. Loudon of the University of Toronto. The large amount of labour entailed by this report results chiefly from the fact that nearly all observers simply record the reading of instruments and leave all reductions and determination of mean values to be done at the central office. The monthly weather map published promptly on the 3rd or 4th of each month shows the meteorological conditions of the month just closed as regards temperature and precipitation and seems to be much valued by agriculturists and others. The 'Monthly Review' is a more detailed review of the weather conditions of each month and includes a description of the movements of cyclones and anti-cyclones.

While the ordinary climatic and forecast work of the meteorological service has been carried on systematically throughout the year, investigation of the connection between meteorological conditions in Canada and those existing in other parts of the globe has been continued with energy.

With the double object in view of obtaining climatic data from Canada's north land and of obtaining continuous barometric observations from the northern portions of the continent, six stations lying between Ft. McMurray on the Athabasca river and the Arctic coast will within the next few weeks be supplied with full meteorological equipments. Investigation has so far led to a belief that the character of our Canadian

SESSIONAL PAPER No. 21

winters depends in a large degree on the intensity and position of the highest mean pressure over the continent and it does not seem improbable that it may be demonstrated that changes in these high pressures are related to atmospheric conditions over the equatorial regions.

It has been arranged that a meeting of meteorologists representing Great Britain and British Dominions shall be held in Quebec immediately after the close of the ter-centenary celebration in July.

The importance of co-operation between different countries for the solution of the wider questions of meteorology has long been recognized on the continent of Europe and meetings of directors of meteorological institutions and observatories are held, from time to time, for the consideration of questions concerning joint action and uniformity of organization. The meetings are also found to be useful on account of the opportunity which they afford for the personal exchange of views and the comparison of experience of methods employed under various conditions of climate and of social surroundings.

Such international meetings have not yet been held outside Europe and the number of imperial or colonial representatives who attend them is very small, although the British empire includes the widest possible diversities of climate, and many of the most favourable positions for observations of international importance are on her soil.

The general object of the conference then will be to consider the best means of obtaining co-operation between the various meteorological organizations of the empire, and the advantages which are anticipated from the meetings are not only those that would naturally follow from an exchange of views as to methods of organization of the tabulation and publication of results. The development of the science in the direction of tracing the laws of sequence of seasons is altogether dependent upon the effective co-operation of workers over very wide areas. Such co-operation has already yielded results of great importance for countries bordering on the Indian ocean and the extension of such work is among the most important economic services that the study of meteorology can render to the countries concerned.

INSPECTION OF STATIONS.

As the accuracy of the forecasts and storm warnings issued from the central office depends to a large degree on the correctness of the information supplied by observers from the telegraph reporting stations, it has been considered advisable to make an annual inspection of these stations and this was done during last summer, omitting Dawson, Atlin and Barkerville as an official could not be spared for a sufficient length of time to reach these outlying points. Most of the storm signal display stations were also visited, as a strong effort is being made to have all masts and signals kept in thorough order and ready for immediate service. It has been found impossible in the past to make an annual inspection of meteorological stations of the second order, namely, those where observations of the highest and lowest temperature and the rainfall are recorded daily; but these stations are visited occasionally as imperfectly adjusted or inaccurate instruments, especially in the western provinces, result in unreliable reports.

SEISMOLOGY.

The seismographs at Toronto and Victoria, B.C., have been kept in operation throughout the year, and have yielded some very interesting data for seismological research. During the period 60 disturbances, large and small, have been recorded at Toronto and 63 at Victoria. Five were very large and two of a medium character.

The following tables shew the Greenwich mean time of the registration of the waves of some of the important disturbances.

Victoria.

Date.	P. Ts.		L. Waves.		Max.		Amplitude.	Ending.	
	h.	m.	h.	m.	h.	m.	Millimetres.	h.	m.
Sept. 2.....	16	10·1	16	18·2	16	29·3	13·2	18	53·4
Oct. 16.....	14	2·2	14	8·5	14	11·3	18	2	37·3
Dec. 30.....	5	35·6	6	1·8	6	2·3	5·0	7	56·8
1908.									
March 26.....	23	10·9	23	21·9	23	25·9	17·0	2	19·9
" 27.....	3	54·9	4	7·1	4	11·9	17·0	6	5·9

Toronto.

Sept. 2.....	16	14·3	{ 16 21·6 16 33·6 }	16	43·4	13·8	19	27·3
Oct. 16.....	14	4·8	{ 14 13·3 5 41·5 }	14	18·5	20·	16	4·5
Dec. 30.....	5	34·1	{ 5 46·7 5 49·5 }	5	49·5	7·9	8	15·0

Unfortunately the Toronto seismograph was dismantled during the very large Mexican earthquake of March 26th, 27th, preparatory to installing the instrument in another building. The disturbance of September 2 was caused by a submarine earthquake near the Aleutian Islands, and reports of it are very meagre. That of October 16, was apparently also submarine, the centre of the disturbance being somewhere near the Friendly Islands, but up to the present time no very definite information has been received. Scientific societies all over the world continue to shew an increased interest in seismology, and our Canadian observations are much valued by them in the discussion of the subject. Copies of large disturbances are forwarded to a number of societies, and in some instances the originals are loaned. Tabulations of all disturbances are forwarded to Prof. Milne, secretary of the Seismological Committee of the British Association to be considered together with reports received from a large number of places in different portions of the world. This committee deals extensively with the subject.

TIME SERVICE.

During the year ending March 31, 1908, sixty-one observations for time were made in the meridian with the transit instrument; of these 42 were stellar and 19 solar observations. The positions of the stars were, as usual, those given in the Berliner Jahrbuch.

The collimation of the transit instrument has been determined as usual by reversal on stars and micrometrical measurements on the collimating telescope. This error remains practically unchanged. The variation in the level error has been less than in the previous year. The stability of the pier remains very satisfactory.

The time exchanges with Montreal, Quebec and St. John have been carried on as usual and registered on the chronograph in Toronto. The error of the Toronto clock and of the timepieces used by the different observers elsewhere are computed from the latest observations. The sidereal and mean time clocks of the Toronto observatory with their various electrical appliances are in good condition, notwithstanding their unfavourable surroundings.

The following table shows the difference between the time determined at Toronto and that given at the various exchanges with Montreal, Quebec and St. John. The sign + indicates that the time sent from the different observatories was faster than that of Toronto.

SESSIONAL PAPER No. 21

Year.	Montreal.	Quebec.	St. John.*	
			From Toronto Chronograph.	From St. John Chronograph.
1907.	Seconds.	Seconds.	Seconds.	Seconds.
April 12.....	+0·02	--0·90	--0·28	--0·03
" 26.....	--1·30	--1·61	--1·09	--0·99
May 10.....	--0·32	--0·28	+0·01	+0·13
" 31.....	--0·26	+0·22	--0·02	+0·14
June 21.....	+0·28	+0·43	+0·24	+0·33
August 9.....	+0·07	--0·65	--0·22	--0·09
" 23.....	--0·25	--0·38	--0·18	--0·11
September 13.....	--0·04	+0·40	--0·03	+0·03
" 27.....	+1·18	--0·72	+0·08	+0·03
October 11.....	+0·28	--0·13	0 18	--0·08
November 15.....	+0·31	--0·68	--0·76	--0·71
December 6.....	+0·21	--0·47	--0·43	--0·31
" 27.....		+1·50	--0·37	--0·42
1908.				
January 17.....	+0·61	--0·74	+0·24	+0·19
February 28.....	--0 10	--0·25	0 21	--0·31
March 20.....	--0 38	--0·34	--0·14	--0·23

* The differences of the results at Toronto and St. John are due principally to wave and armature time.

Sun spot observations have been continued as usual, maps of the sun's surface four inches in diameter being made upon eighty-seven days.

On April 3, 1907, a rather large group appeared north of the equator well over the eastern limb, becoming central on the 5th and off the western limb on the 12th. From this date the sun had comparatively few spots on it until May 4, when a moderately sized spot appeared on the east limb, being south of the equator, and on the 7th, a small group developed due north of this spot close to the equator, both groups going around the western limb on the 15th.

On June 17, a very large group composed of two large spots with numerous small ones was seen on the sun south of the equator, finally going around the western limb on the 25th.

Scattered groups of small spots both north and south of the equator traversed the sun's disc up to October 14, when a rather large elongated group of spots appeared over the eastern limb just north of the equator and disappearing over the western limb October 26. This group appears to be the return of a group first noticed near the centre of the sun's disc on September 23. Again this group returned, becoming central November 15; its appearance being considerably altered becoming more compact. Another revolution witnessed its return in a scattered prolonged group being central on December 12.

The final revolution of this group saw it reduced to two moderately sized spots with two or three very small ones a little to the south. It became central on January 8, 1908, finally disappearing, and from this date to March 31, 1908, only a few scattered small spots were observed.

A most successful observation of the transit of Mercury across the disc of the sun was obtained at the observatory in Toronto. The 6-inch Cook refractor being used and the image of the sun was projected on paper and several drawings made. The sun was first sighted at 7h. 53m. 18 secs., 75th meridian time, and the planet was at once seen a little east of the vertical line and not far from the northern limb. Eight positions of the planet were marked on the image of the sun with their true times.

The 75th meridian times at	h.	m.	sec.	
Egress.....	8	48	20	Internal contact.
"	8	49	47	Central "
"	8	50	33	External "

8-9 EDWARD VII., A. 1909

The projected image of the sun was eight inches in diameter and the definition extremely fine. Near the sun's centre was seen a fine large group of sun spots and in the northwestern quadrant were two groups about to disappear around the western limb. Latitude $43^{\circ} 39:36$ N; and longitude 5h. 17m. 34:65 secs. W., being the position of the observatory.

VOLUNTEER OBSERVERS.

The country is indebted to volunteer observers for a large portion of climatic data used in the preparation of the Meteorological Reports and the Dominion is to be congratulated that it possesses so many persons, who in the interest of science, will devote so much time to the duties entailed in reading instruments and recording observations.

UNITED STATES WEATHER BUREAU.

I desire, finally, to express my entire appreciation of the cordial relations existing between the Meteorological Service and the United States Weather Bureau. All Communication have been characterized by the utmost courtesy and an evident desire for friendly co-operation in the solution of meteorological problems affecting this continent.

Respectfully submitted,

R. F. STUPART,
Director.

APPENDIX A.

METEOROLOGICAL SERVICE, ST. JOHN OBSERVATORY,
ST. JOHN, N.B., June, 1908.

R. F. STUPART, F.R.S.C.,
Director, Meteorological Service,
Toronto, Ont.

SIR,—I have the honour to present my annual report on the St. John Observatory for the fiscal year ending March 31, 1908.

Meteorological Service.—The usual meteorological observations have been continued without interruption or change. A new anemograph of improved construction was installed and is giving most satisfactory results. This, as well as the other recording and eye-reading instruments, is in excellent condition. The bi-daily observations made at 9 a.m. and 9 p.m., 60th meridian time, are promptly wired to the central office at Toronto. Commercial houses and transportation companies are frequently given information from our records to assist in adjusting claims for damage to perishable goods in transit, &c. The records are also occasionally required in the courts and evidence given in suits at law which partially or wholly hinge on prevailing weather conditions. In addition to our daily and monthly local reports the press frequently request special information during periods of extremes, heavy storms and other conditions of interest to the public.

Morning Weather Bulletin.—The weather bulletin has been promptly issued every week-day forenoon, has been distributed, displayed in public places and published by the evening press as heretofore reported. Forecasts and synopses continue of inestimable value to mariners, shippers, contractors and other various interests which depend upon the information contained in the bulletin for present and probable change of conditions.

SESSIONAL PAPER No. 21

The forecasts and storm warnings are telephoned to St. Martins and Point Lepreau and storm signals displayed when ordered by the central office. The public make free use of the telephone and requests for information are received and answered at all hours.

Time Service of the Maritime Provinces.—Determination of clock errors and rates have been made by observations of stars with the meridian telescope nearly every fine night, the observations and clock comparisons being recorded on the chronograph as formerly reported. The time balls at St. John and Halifax have been dropped each week day at 1 p.m., 60th meridian time. The daily time signal is sent over the Western Union wires throughout the Maritime provinces for an interval of two minutes ending at 10 a.m. of the 60th meridian, is used by mariners at our seaports for rating their chronometers, and is the standard of time for all parts of these provinces. The transmitting clock that automatically sends out these signals is corrected very accurately by comparison with our standard clocks which have their errors and rates determined as above stated. At other times than 10 a.m. signals are sent on request by telegraph and telephone from the same clock, the beats from the relay being audible to a considerable distance through the telephone.

Wireless Time Signals.—The apparatus installed at Camperdown, N.S., to automatically repeat our 10 a.m. clock signals from the land line to wireless has been doing most satisfactory work. Information from navigators indicate that the signal is received distinctly and this method of sending the time most practical for checking ships' chronometers at sea.

Clocks.—The Riefler sidereal clock, No. 94, which is mounted in the constant temperature room in the basement and run under constant pressure, is the primary standard clock of the observatory. It continues to give most satisfactory results. The secondary standard Kullberg, No. 6752, is mounted in clock room with the Riefler. The transmitting clock as well as the master clock used for controlling and hourly correcting other clocks on circuit outside of the observatory are mounted in the office along with the chronograph and other electrical apparatus pertaining to the time service. The electric clock in the Western Union office at Halifax has been daily synchronized by wire from our transmitting clock. Return signals from this clock compared on the chronograph with our standard mostly show an inappreciable difference between the time of the two clocks.

Halifax Time Ball.—Early in the year you instructed me to have a new time ball tower and apparatus installed at the Citadel, Halifax, to replace the temporary apparatus in use there. At the close of the fiscal year the tower as well as the apparatus was under construction.

I have the honour to be, sir,

Your obedient servant,

D. L. HUTCHISON,

Director, St. John Observatory.

..

APPENDIX B. .

QUEBEC OBSERVATORY,

QUEBEC, June 2, 1908.

To the Director,
Meteorological Service,
Toronto.

SIR,—I have the honour to transmit my annual report for the year ending March 31, 1908.

My duties at this observatory have remained the same and the usual observations were taken as heretofore at this station as well as on the citadel.

8-9 EDWARD VII., A. 1909

The time ball has been in good working order during the whole navigation season.

On many occasions during the past year, I have been asked by civil engineers, colonization agents and other parties to give information respecting precipitation and temperature in different parts of the province of Quebec. It seems that the establishment of few more stations of the third class would render valuable services to parties interested in colonization.

Without making any suggestions in the matter, I deem it my duty to draw your attention to the increasing number of queries on this subject to which I had to answer during the past few years.

I have the honour to be, sir,

Your obedient servant,

ARTHUR SMITH,
Director.

MAGNETIC OBSERVATORY.

Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the annual report of the Magnetic Observatory, Agincourt.

Mr. Menzies has been continued as observer in charge of this observatory and his assiduous attention to details of duty coupled with his skill as a mechanical expert, have led to exceedingly satisfactory results.

The self-recording instruments have been kept in continuous operation throughout the past year and the hourly ordinates obtained from the photographic traces of declination and horizontal force have been tabulated. Numerous determinations of the absolute values of the magnetic elements have been made and the all trace readings have been reduced to absolute values in C.G.S. units for publication. The increase in easterly declination continues at the rate of 4' per annum; the dip has increased from $74^{\circ} 32' \cdot 6$ in 1903 to an average of $74^{\circ} 37' \cdot 1$ during the past three months. The total force has diminished from 0.61792 in 1903 to 0.61638 and the horizontal force from 0.16468 to 0.16349. Early in the summer Mr. Jackson was assigned for magnetic survey duty in the western provinces, and complete determinations of the magnetic elements were made at Edmonton, Calgary, Medicine Hat, Swift Current, Prince Albert, Battleford, Regina, Brandon and Fort William. It is proposed to extend this survey to the Gulf of St. Lawrence and possibly to the shores of the Hudson bay during the coming summer. It is felt that the magnetic survey of Canada, together with the meteorological equipment and maintenance of stations in the far north, are duties that Canada owes to international science.

I have the honour to be, sir,

Your obedient servant,

R. F. STUPART,
Director.

SESSIONAL PAPER No. 21

APPENDIX No. 9.

EXAMINATION OF MASTERS AND MATES.

OTTAWA, September 26, 1908.

G. J. DESBARATS, ESQ.,
Acting Deputy Minister of Marine and Fisheries,
Ottawa, Ont.

SIR,—I have the honour to submit the annual report of the work under my supervision in connection with the examinations of masters and mates throughout Canada for foreign-going and local certificates, also beg to attach the number of certificates issued by this branch of the department from April 1, 1907, to June 30, 1908.

In the course of the year, four new appointments have been made, the vacancies which have occurred through the resignation of officials, have been filled at Nelson, B.C., West Selkirk, Man., and Halifax, N.S. As no applications have been received for the offices at St. John and Kingston, they, therefore, remain vacant for the present.

A new office has been opened at Edmonton, where it was thought, owing to the development and the traffic on the lakes of the surrounding vicinity, such appointment was deemed necessary. In a very near future, an examiner will be appointed at Port Arthur.

You will be pleased to note that favourable comments have been made at frequent intervals in the course of the year by interested parties, that it is already noticed that our seamen are developing an ambition to perfect themselves in their profession.

Though a great number of failures have occurred which goes to demonstrate that the examiners generally are on the alert and following their duties conscientiously, yet those who have passed have shown without the least doubt that they had taken some trouble to study and make themselves conversant with those subjects so important in navigation such as the rule of the road, chart work, and the deviation and errors of the compass. The above remarks apply to our local certificates.

Respecting the foreign-going examinations, though there would seem a tendency of becoming fewer, owing to the alteration in our coasting laws, yet, I notice that the work in connection with these examinations performed by the candidates, are neat in appearance and are more systematically performed than heretofore, which is certainly an indication of betterment.

Our offices are now equipped with every object necessary to conduct examinations thoroughly and efficiently, which fact is deeply appreciated by our examiners.

A nominal monthly rent is paid for those offices which are absolutely for the examiners' use only, and by which the fear that the valuable instruments placed under the care of the examiners, are not tampered with by outsiders is eliminated.

A change in our coasting laws was made during last session, by which sailing vessels of a certain tonnage are exempted to comply with certain sections of the Shipping Act, at the same time the coasting limits were greatly extended, thereby enabling our products to be conveyed to certain foreign territories at a minimum expense.

I have the honour to be, sir,
Your obedient servant,

L. A. DEMERS,
Chief Examiner.

CERTIFICATES TO MASTERS AND MATES.

From April 1, 1907 to September 1, 1908, 14 masters, 28 mates and 33 second mates, foreign-going certificates were issued.

For the same period 240 masters, 131 mates received a certificate for coasting, inland and minor waters. There were also two certificates of service and 46 permits issued.

The number of candidates who failed in their examinations, was 14 for sea-going certificates and 75 for certificates, coasting, inland or minor waters.

From April 1 to September 1.	Masters.	Mates.	2nd Mates.	Failures.
Sea-going.....	14	28	33	14
Coasting, inland and minor waters.....	240	131	.....	75
Service.....	1	1		
Permits.....	46			
<i>Renewals.</i>				
Sea-going.....	3	2		
Service.....	3			
Coasting, inland and minor waters.....	22	5		
Service.....	13	4		

SESSIONAL PAPER No. 21

APPENDIX No. 10.

LIVESTOCK Shipments season 1907-1908, from the Port of Montreal.

Months.	Sheep.	Cattle.	Horsee.	Hay.	Grain.	Men.	U. S. Cattle.
1907.				Lbs.	Lbs.		
May	603	12,435	27	3,294,570	1,038,110	484	3,650
June.....	1,464	15,249	31	4,109,130	1,344,260	604	6,791
July.....	1,374	16,281	10	4,495,330	1,422,330	647	5,044
August ..	704	16,164	16	4,419,050	1,666,370	633	1,230
September.....	810	11,852	12	3,883,670	354,000	474	481
October.....	2,396	13,230	6	4,436,510	469,270	534	1,640
November	4,234	11,666	72	4,045,830	396,690	492	1,264
Totals.....	11,585	96,877	174	28,684,090	6,671,030	3,868	20,100

United States cattle included in the total of 96,877.

FROM THE PORT OF ST. JOHN, N.B.

Months.	Sheep.	Cattle.	Horses.	Hay.	Grain.	Men.	U. S. Cattle.
1907.				Lbs.	Lbs.		
December.....	2,368	4,022	1	1,435,360	97,700	171	66
1908.							
January.....		2,668	12	815,520	188,300	106	1,748
February.....	1,800	5,124	14	1,560,420	445,599	220	3,437
March.....		4,416	12	1,346,440	372,800	174	2,504
April.....		3,379	12	926,790	307,617	143	1,549
May.....		601		168,200	47,900	21	
Totals.....	4,168	20,210	51	6,252,730	1,459,916	835	9,304

United States cattle included in the total of 20,210.

8-9 EDWARD VII., A. 1909

DIFFERENT Ocean Lines by which the Live Stock was shipped during season 1907-8,
from Montreal.

Ocean line.	Sheep.	Cattle.	Horses.
Reford & Co..	743	30,932	68
Canada Pac. Ry. Line.. . . .	7,467	30,075	17
Allan Line.. . . .	.....	15,835	48
Dominion Line.. . . .	2,207	8,767	4
Leyland Line.. . . .	1,056	7,367	..
Furness Withy Line.. . . .	.....	4,001	1
Elder Dempster Line.. . . .	112	.....	36
	<hr/> 11,585	<hr/> 96,977	<hr/> 174

DIFFERENT Ocean Lines by which the Live Stock was shipped during season 1907-8,
from St. John, N.B.

Ocean line.—The Canadian Pacific Railway Company Line, Donaldson Line, Manchester Liners. Totals, sheep, 4,168; cattle, 20,210; horses, 51.

TOTAL Shipments of Live Stock from Canada and Ports in Great Britain, &c., to
which the Live Stock was shipped.

	Sheep.	Cattle.	Horses.
London.. . . .	6,720	55,290	17
Glasgow.. . . .	743	30,801	166
Liverpool.. . . .	5,749	13,339	4
Bristol.. . . .	2,247	12,397	..
Manchester.. . . .	182	5,120	2
Newcastle.. . . .	.....	240	..
South Africa.. . . .	112	.....	36
	<hr/> 15,753	<hr/> 117,187	<hr/> 225

SESSIONAL PAPER No. 21

COMPARATIVE STATEMENT of the number of Cattle shipped from Canada to British ports from the year 1902-3 to 1907-8.

	SHEEP.			CATTLE.			HORSES.			TOTALS.			
	Montreal.		St. John.	Halifax.	Montreal.	St. John.	Halifax.	Montreal.	St. John.	Halifax.	Sheep.	Cattle.	Horses.
1907-8.....	11,585	4,168	Nil.	20,210	96,977	20,210	Nil.	174	51	Nil.	15,753	127,187	225
1906-7.....	10,791	1,371	"	31,148	128,160	31,148	"	661	57	"	12,162	159,308	718
1905-6.....	19,077	3,971	"	33,543	126,871	33,543	1,012	568	79	"	23,048	161,456	647
1904-5.....	19,422	17,293	"	33,833	108,553	33,833	745	279	213	"	66,715	143,131	492
1903-4.....	57,741	23,428	1,475	25,855	133,594	25,855	5,456	361	31	31	82,644	164,905	423
1902-3.....	61,017	19,310	426	37,453	147,201	37,453	3,856	373	115	17	80,753	188,510	503

APPENDIX

CITADEL SIGNAL

YEARLY RECORD OF SHIPPING

Year and Month.	BRITISH MEN-OF-WAR.			FOREIGN MEN-OF-WAR.			1ST CLASS STEAMERS.			2ND CLASS STEAMERS.		
	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.
1907.												
July.....				1	1	....	54	49	5	57	57	....
August.....						..	47	47	.....	48	48	.....
September... ..	1	1	.....	2	2	.....	56	52	4	51	51	.....
October							55	50	5	50	50	.....
November	1	1	.....				43	39	4	44	44	.....
December	1	1	.....				50	50	....	47	47	...
1908.												
January .....			..				60	57	3	49	49	.....
February.....							56	54	2	34	33	1
March.							54	54	.....	48	48	.....
April							72	70	2	41	41	.....
May... ..	2	2					41	40	1	61	61	....
June.. ..				1	1	.....	44	41	3	65	65	....
	5	5	.....	4	4	...	632	603	29	595	594	1

HALIFAX, N.S.,
July 3, 1908.

SESSIONAL PAPER No. 21

No. 11.

STATION.

AS PER RECORD FOLIOS.

SHIPS, BARQUES AND BARQUENTINES.			BRIGS AND BRIGANTINES.			SCHOONERS, 3-MAST OR BEARING PRIVATE SIGNALS.			MONTHLY TOTALS.			Remarks.
Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	
4	4	7	7	123	118	5	1,304 1,273 31 Total vessels reported. arrived passed
2	2	.....	1	1	.....	.....	.....	.....	98	98	.....
.....	.....	.....	.....	.....	.....	9	8	1	119	114	5
1	1	.....	1	1	.....	1	1	.....	108	103	5
2	2	.....	.....	.....	.....	4	4	.....	94	90	4
1	1	.....	1	1	.....	3	3	.....	103	103	.....
.....	
3	3	.....	1	1	.....	2	2	.....	115	112	3
.....	.....	.....	1	1	.....	2	2	.....	93	90	3
1	1	.....	1	1	.....	1	1	.....	105	105	.....
1	1	.....	.....	.....	.....	5	5	.....	119	117	2
1	1	.....	.....	.....	.....	6	6	.....	111	110	1
2	2	.....	.....	.....	.....	4	4	.....	116	113	3
.....	
18	18	.....	6	6	.....	44	43	1	1,304	1,273	31

(Signed) H. WALKEM, *Lieut. R.C.E.*,
Supt. Signal.

APPENDIX No. 12.

STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of Canada.

PRINCE EDWARD ISLAND.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Alberton Range	William Champion	Oct. 25, 1897..	100 90
Block House	A. S. McNeil	Mar. 25, 1901..	340 00
Brighton Range	James Lewis	" 1, 1899..	100 00
Brush Wharf.	D. W. McPherson	Jan. 13, 1899..	70 00
Crapaud, Outer.	Abner J. Howatt	July 22, 1893..	100 00
" Inner.	James Inman	Aug. 13, 1901..	100 00
Cardigan River.	John D. Morrison	" 15, 1901..	100 00
Cape Bear	Luther Jordan	Apr. 12, 1905..	375 00
Cape Egmont	Jos. J. D. Gallant	Oct. 21, 1902..	200 00
Cape Tryon	William Bell	Mar. 17, 1905..	200 00
Cove Head Range	John A. Kielly	Nov. 27, 1890..	90 00
Darnley Range	Geo. W. Wigglns.	Oct. 16, 1896..	125 00
Darnley Basin	Chas. Taylor	June 14, 1897..	60 00
East Point	Lauchlin McDonald	Jan. 18, 1901..	600 00
Fish Island	Patrick Gould	Dec. 7, 1906..	225 00
Georgetown, Inner	Jesse G. Clark	Aug. 14, 1901..	150 00
Georgetown Railway Wharf	John Westaway	Jan. 16, 1906..	100 00
Grand River, East Lot 56..	Alfred Robertson	Oct. 5, 1898..	100 00
Grand Tracadie	John M. McDonald	May 24, 1901..	100 00
Hazard, Inner Range	Angus Beaton	Nov. 21, 1902..	60 00
" Outer Range	Daniel McRae	Apr. 6, 1900..	70 00
Indian Point	J. S. Allen	May 18, 1898..	375 00
Little Channel	William Hardy	" 26, 1875..	100 00
Murray Harbour, Inner	Robert Penny	Nov. 11, 1897..	50 00
" Outer	Lemuel McLeod	Dec. 21, 1897..	50 00
Miminegash, Inner	Elijah Costain	May 18, 1906..	60 00
" Outer	Patrick O'Brien	" 14, 1897..	60 00
New London	James H. McLeod	Jan. 29, 1896..	125 00
North Cape	James Phee	Sept. 4, 1897..	300 00
North Rustico	Jos. N. Pino	Feb. 6, 1897..	125 00
Orwell	John McDonald	June 25, 1879..	70 00
Point Prim	Donald Gillis	Dec. 10, 1897..	300 00
Panmure Island	Colin Steele	June 3, 1901..	250 00
Sandy Island, (Cascumpec)	Jas. C. Tuplin	May 5, 1897..	300 00
Savage Harbour	Jas. A. McDonald	July 11, 1889..	100 00
Sea Cow Head	M. P. O'Roneghan	Apr. 21, 1873..	250 00
Souris, East	John D. Lavie	June 23, 1905..	350 00
Summerside Wharf	John Fraser	Apr. 12, 1897..	100 00
Summerside Range	George Stavart	Sept. 8, 1895..	80 00
St. Andrew's Point	George Connor	June 3, 1901..	150 00
St. Peter's Island	James W. Taylor	May 1, 1897..	200 00
St. Peter's Harbour	Albert Anderson	July 25, 1900..	130 00
Tignish Run	Agapè Gaudet	Aug. 30, 1897..	130 00
Warren Farm Range	A. S. McNeil	May 16, 1907..	100 00
West Point	William McDonald	Jan. 22, 1876..	300 00
Wood Island	Roderick W. McKay	Apr. 11, 1899..	250 00
Wood Island Range	James Young	Nov. 14, 1902..	80 00
Wright's Range	Charles Wright	June 14, 1894..	100 00

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.

NOVA SCOTIA.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Abbott's Harbour Pole.....	W. H. D'Entremont.....	May 22, 1888..	90 00
Advocate Harbour.....	John H. Morris.	Aug. 10, 1904..	275 00
Amet Island.....	Lloyd Rogers.....	Nov. 11, 1902..	450 00
Amherst Harbour Range.....	William Shea.....	May 21, 1908..	150 00
Annapolis.....	Jos. McMillan.....	Mar. 1, 1908..	100 00
Apple River Light & Fog Alarm.....	Hill E. Elderkin.....	" 31, 1905..	700 00
Argyle.....	Chas. A. Amiro.....	Feb. 6, 1893..	400 00
Arichat.....	Capt. Wm. Lavashe.....	Oct. 17, 1898..	250 00
Arisaig.....	Hugh R. McAdam.....	Nov. 14, 1898..	100 00
Baccaro.....	Wm. L. Smith.....	Jan. 9, 1907..	450 00
Barrington Light Ship.....	Capt. Jno. H. Lyons.....	June 18, 1897..	800 00
Battery Point.....	Henry Naas.....	Mar. 12, 1897..	300 00
Bear River.....	Wm. Hunt.....	Apr. 10, 1905..	150 00
Beaver Harbour.....	L. G. Cameron.....	Feb. 15, 1902..	150 00
Bear Island.....	Michael O'Brien.....	Dec. 7, 1906..	300 00
Beaver Island.....	W. E. O'Leary.....	Feb. 22, 1900..	400 00
Belliveau Cove.....	J. H. Belliveau.....	" 16, 1889..	80 00
Betty Island.....	P. E. Christian.....	June 29, 1904..	500 00
Bird Island.....	H. C. McKay.....	May 21, 1901..	450 00
Black Rock.....	Chas. Robinson.....	Mar. 16, 1885..	330 00
Black Rock Point.....	M. D. Morrison.....	June 8, 1892..	250 00
Boar's Head.....	F. Ruggles.....	May 24, 1901..	350 00
Bass River.....	David Vance.....	Oct. 24, 1907..	100 00
Bon Portage.....	Angus Greenwood.....	Jan. 14, 1907..	350 00
Briar Island Light.....	J. N. Peters.....	June 6, 1901..	400 00
Briar Island Fog Alarm.....	B. H. Morrell.....	" 6, 1901..	400 00
Brooklin Pier Pole.....	F. F. Gardner.....	Feb. 6, 1885..	100 00
Bunker's Island.....	T. F. Doane.....	July 27, 1904..	350 00
Bunker's " , North End.....	Jas. H. Schoville.....	Jan. 16, 1907..	200 00
Budget.....	Freeman Pride.....	Dec. 7, 1905..	200 00
Burnt Coat.....	Wm. Y. Falkner.....	June 22, 1898..	250 00
Bourgeois Inlet.....	Martin Burke.....	Dec. 1, 1902..	60 00
Bunker Island, n. end.....	James H. Schoville.....	Jan. 16, 1907..	200 00
Campbell's Island.....	John A. McDonald.....	Feb. 16, 1907..	120 00
Candlebox Island.....	Benjamin Leblanc.....	Nov. 1, 1892..	300 00
Canso Harbour.....	Joseph Long.....	Dec. 31, 1896..	250 00
Canso Harbour, False Passage.....	Joseph Long.....	Aug. 4, 1903..	50 00
Canso Harbour Range.....	Wm. J. Mathews.....	Dec. 17, 1904..	200 00
Cape D'Or Fog Alarm.....	F. H. Dewis.....	April 13, 1898..	800 00
Cape Fourchu Light and Fog Alarm.....	F. S. Doane.....	Dec. 31, 1904..	1,000 00
Cape George.....	John Murray.....	Nov. 3, 1882..	200 00
Cape La Ronde.....	John J. Mauger.....	Nov. 16, 1898..	700 00
Cape North.....	Norman McLeod.....	Oct. 14, 1899..	400 00
Cape Roseway Light and Fog Alarm.....	John L. McKenna.....	Mar. 31, 1899..	800 00
Cape Sable Light and Fog Alarm.....	Arthur Cunningham.....	July 16, 1902..	800 00
Cape Race Light and Fog Alarm.....	John Myrick.....		1,800 00
Cape St. George.....	Alex. L. McEachern.....	Sept. 8, 1898..	450 00
Cape St. Lawrence.....	Chas. Jamieson.....	" 21, 1893..	400 00
Cape St. Mary's.....	Benj. H. Robichau.....	July 5, 1886..	350 00
Cape Sharpe.....	Freeman Yorke.....	June 30, 1902..	750 00
Canning River, Inner.....	Fred Clarke.....	April 29, 1902..	100 00
" Outer.....	Fred Bishop.....	" 29, 1904..	100 00
Cariboo Island.....	D. Falconer.....	Dec. 20, 1902..	300 00
Carter's Island.....	Robert McDonald.....	Jan. 4, 1886..	275 00
Caveau Point Range.....	Germain Chaisson.....	Aug. 20, 1897..	150 00
Charlo Cove Light.....	Stéphen C. Richard.....	Nov. 4, 1901..	120 00
Chebucto Head Light and Fog Alarm.....	Capt. Richard Holland.....	Oct. 1, 1906..	800 00
Chester Ironbound.....	Uriah Young.....	Feb. 15, 1884..	400 00
Cheticamp.....	Marcelin Muise.....	Nov. 27, 1896..	300 00
Cheticamp Range.....	Philip Burgeois.....	May 23, 1898..	150 00
Church Point.....	J. H. Saulnier.....	Aug. 8, 1878..	200 00
Clarke's Cove.....	Roderick McDonald.....	April 2, 1904..	100 00
Coffin's Island.....	Chas. M. Firth.....	June 30, 1880..	400 00

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.

NOVA SCOTIA—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.	
			\$	cts.
Coldspring Head.....	L. Brownell.....	Mar. 27, 1901..	120	00
Cole Harbour.....	Wm. M. Munro.....	April 23, 1907..	50	00
Cole Harbour Range.....	Geo. C. Jamieson.....	Oct. 21, 1898..	150	00
Country Harbour.....	Henry Burke.....	June 11, 1902..	400	00
Cranberry Island Light and Fog Alarm.....	James P. Hanlon.....	April 10, 1905..	850	00
Creighton's Head.....	H. H. Creighton.....	May 6, 1874..	200	00
Cross Island Light and Fog Alarm.....	W. H. Wynacht.....	April 13, 1898..	800	00
Croucher's Island.....	Geo. Croucher.....	Jan. 31, 1883..	300	00
Crotch.....	C. J. O. Hanley.....	May 6, 1906..	200	00
Dartmouth.....	Wm. Patterson.....	June 3, 1903..	100	00
Devil's Island.....	W. G. Fulker.....	May 3, 1886..	420	00
Digby Pier Pole.....	Edwin Beaman.....	" 29, 1897..	100	00
Dover Harbour.....	Edward Morash.....	Oct. 1, 1906..	200	00
Duffus Point, Inner.....	Alex. Fraser.....	Jan. 13, 1903..	125	00
" Outer.....	M. McLean.....	" 13, 1903..	125	00
Economy Pole.....	Ingersoll McLellan.....	May 16, 1899..	*6	00
Egg Island.....	Jos. B. Stoddard.....	" 6, 1907..	500	00
Eddy Point.....	Edward Mundell.....	July 28, 1903..	400	00
Fish Island, Tusket River.....	Severin LeBlanc.....	" 1, 1889..	250	00
Flint Island.....	Michael Brean.....	Aug. 20, 1904..	450	00
Fourche Head Light.....	Albert Hooper.....	May 18, 1908..	120	00
Fort Point.....	J. E. Misener.....	" 16, 1896..	150	00
Freestone Island.....	Michael Sampson.....	" 11, 1907..	150	00
Fisherman's Harbour.....	Theodore Beiswanger.....	Dec. 8, 1905..	150	00
Gabarouse.....	John Hardy.....	Nov. 22, 1890..	200	00
Gilbert Point.....	Jos. W. Melanson.....	Aug. 18, 1894..	300	00
George's Island Light and Fog Bell.....	Robt. Ross.....	Jan. 18, 1876..	250	00
Gillies Point.....	Hector McLean (M's Son).....	Dec. 18, 1897..	150	00
Glasgow Point.....	Abram Clory.....	July 25, 1894..	150	00
Grandique.....	Daniel Clough.....	July 4, 1884..	60	00
Grand Etang.....	Severin B. LeBlanc.....	Mar. 25, 1905..	60	00
Grand Passage Brier Island.....	Chas. Buckmen.....	Jan. 7, 1901..	250	00
Green Cove.....	A. J. Sallown.....	Dec. 28, 1900..	200	00
Granville Centre.....	Henry Rooney.....	Feb. 24, 1904..	75	00
Green Island.....	Wm. A. Duann.....	May 12, 1903..	500	00
Gull Rock.....	L. D. Orchard.....	Jan. 1, 1877..	400	00
Guyon Island.....	Jos. W. Hardy.....	" 30, 1903..	400	00
Glace Bay Range.....	Michael McNeil.....	Nov. 19, 1907..	75	00
" ".....	Angus McFarlane.....	" 19, 1907..	75	00
Guysboro.....	Moses C. Scott.....	April 19, 1884..	300	00
Harbour au Bouche.....	Capt. Patrick Webb.....	Feb. 19, 1896..	250	00
Hawke Island.....	Bartholomew Boudrot.....	Dec. 7, 1904..	250	00
Herring Cove.....	Wm. Brackett.....	Aug. 28, 1897..	100	00
Henry Island.....	D. A. McLennan.....	" 1, 1907..	400	00
Highland Village.....	W. A. Hennesy.....	May 6, 1905..	25	00
Hobson's Island.....	John D. Smettzer.....	April 10, 1900..	300	00
Horton Bluff.....	Mrs. S. M. Rathburn.....	Sept. 3, 1879..	250	00
Hnbhards Cove.....	Albert S. Coalin.....	Oct. 31, 1903..	250	00
Harbour Island.....	Chas. D. Hodgson.....	June 16, 1908..	250	00
Indian Harbour.....	Henry Boutilier.....	June 6, 1901..	150	00
Ingonish.....	Robt. V. Warren.....	Sept. 17, 1903..	360	00
" Harbour.....	Matthew Hawley.....	May 13, 1897..	140	00
Ironbound Island.....	Howard M. Wolf.....	June 22, 1895..	250	00
Isaac's Harbour.....	Ira L. Griffin.....	April 28, 1894..	200	00
Isle au Haute.....	Percy E. Morris.....	Aug. 2, 1904..	500	00
Iona.....	F. X. S. McNeil.....	Nov. 16, 1901..	120	00
Jeddore Rock.....	John W. Mitchell.....	Sept. 29, 1882..	400	00
Jeddore Harbour Range.....	Jeremiah Harpell, jr.....	Jan. 21, 1901..	200	00
Jerome Point.....	Kenneth McAskill.....	July 30, 1901..	250	00
Jerseyman's Island.....	Alphonse Theriault.....	" 1, 1905..	300	00
Jordon Bay.....	John Frederick.....	Dec. 19, 1906..	100	00
Kidstone's Island.....	Donald McRae.....	May 17, 1892..	200	00

Per month during season of navigation.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.

NOVA SCOTIA—Concluded.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Kingsport.....	C. H. Huntley.....	June 30, 1890..	100 00
Ketch Harbour.....	Chas. Martin.....	May 19, 1905..	80 00
La Have.....	W. H. Palmer.....	" 22, 1878..	200 00
Lingan Head.....	John Walsh.....	July 4, 1904..	200 00
Liscomb.....	James Henlow.....	Jan. 2, 1908..	300 00
Little Dyke.....	S. Stewart.....	May 1, 1906..	25 00
Little Hope.....	Jason Payzant.....	Oct. 22, 1901..	500 00
Little Loraine Harbour.....	Patrick Gallant.....	Jan. 19, 1900..	80 00
Little Narrows.....	Alex. W. Ross.....	May 23, 1902..	120 00
Louisburg.....	Philip Price.....	Nov. 8, 1897..	350 00
Louisburg Harbour Range.....	Thomas Corrington.....	Oct. 6, 1897..	200 00
Louisburg Fog Alarm and Signal Station.....	D. A. Campbell.....	Mar. 20, 1902..	1,120 00
Low Point.....	John G. Peters..	Oct. 1, 1865..	460 00
Low Point Fog Alarm.....	Thos. O'Neil.....	May 2, 1904..	500 00
Mabou, Outer.....	E. Doyle.....	June 14, 1897..	70 00
" Inner.....	Roderick McLean.....	Dec. 7, 1906..	50 00
Main à Dieu.....	John Pope.....	Sept. 11, 1902..	*300 00
Margaree.....	John A. McRae.....	Feb. 28, 1907..	400 00
Margaree Harbour, Inner.....	R. McLellan.....	June 8, 1901..	50 00
" Outer.....	Miles Dunn.....	May 12, 1903..	50 00
Margaret's Bay.....	Albert Pearl.....	Dec. 29, 1873..	500 00
Margaretsville.....	Mrs. Ruth Early.....	Feb. 19, 1887..	230 00
Marie Joseph.....	John Baker.....	Jan. 6, 1905..	325 00
Marjories Island.....	Norman McDonald.....	July 4, 1884..	100 00
Masstown Pole.....	G. W. Vance.....	June 29, 1898..	25 00
Mauger's Beach Light and Front Light.....	Wm. Icton, sen.....	July 6, 1903..	800 00
Meteghan.....	L. C. Comeau.....	Oct. 12, 1875..	100 00
Moser's Island.....	Samuel Moser.....	Nov. 6, 1885..	350 00
Mullin's Point.....	James Mullins.....	June 8, 1892..	200 00
Munro Point.....	Malcolm Buchanan.....	Oct. 25, 1905..	150 00
NcKenzie's Point.....	Hector McRae.....	Aug. 20, 1890..	160 00
Musquodoboit Harbour Range, 'B'.....	{ John Kent.....	Apr. 29, 1904..	100 00
" " " 'F'.....	{ Fred. Kent, assistant.....	Mar. 11, 1908..	50 00
" " " 'F'.....	Jeremiah Kent.....	Apr. 29, 1904..	125 00
McNeil's Beach.....	Lauchlin McNeil.....	Aug. 6, 1884..	60 00
McMillan's Point.....	John J. Chisholm.....	Dec. 2, 1905..	150 00
McNab's Island.....	Mathew Lynch.....	June 23, 1905..	350 00
Negro Harbour Range.....	Levi Perry.....	" 17, 1899..	250 00
Negro Island.....	Byron Nickerson.....	July 26, 1897..	300 00
Neil Harbour.....	A. A. Buchanan.....	Aug. 14, 1899..	150 00
North Canso.....	Robie McKay.....	Feb. 4, 1882..	350 00
Noel.....	Geo. C. Davidson.....	Apr. 25, 1906..	112 50
Ouitique Island.....	Fred. A. Burke.....	Feb. 16, 1907..	350 00
Page Island.....	Alfred M. Powell.....	Dec. 5, 1905..	200 00
Parrsboro'.....	William Pettis.....	" 6, 1888..	375 00
Pease Island.....	Thos. Baker.....	May 19, 1879..	350 00
Peggy's Point.....	Sydney H. Garrison.....	Dec. 22, 1902..	350 00
Pennant.....	P. A. Gray.....	June 30, 1903..	100 00
Petite de Grat.....	E. Landry.....	Feb. 23, 1897..	200 00
Pictou Bar.....	Wm. Munro.....	Nov. 22, 1890..	460 00
Pictou Custom House.....	Chas. Bone.....	June 14, 1907..	100 00
Pictou Island.....	Andrew McFarlane.....	" 8, 1892..	400 00
Pictou Island Pier, west end.....	Chas. D. Patterson..	Mar. 29, 1905..	400 00
" " " ".....	Hugh McLean.....	June 24, 1905..	100 00
Pictou Harbour Range.....	David Lowden.....	July 12, 1897..	150 00
Piper's Cove.....	John C. McNeil.....	Dec. 18, 1897..	120 00
Point Aconi.....	John Charles Bonner.....	Nov. 6, 1903..	200 00
Point Edward, Front.....	J. B. Rudderham.....	Jan. 15, 1905..	250 00
" " " Back.....	A. J. Lewis.....	May 22, 1905..	150 00
Point Prim Light, Fog Alarm, Digby.....	W. E. Ellis.....	Mar. 8, 1875..	800 00
Point Tupper.....	Duncan Gillis.....	Apr. 1, 1906..	300 00
Pomquette Island.....	M. Murphy.....	Dec. 18, 1890..	350 00

* Temporary keeper.

8-9 EDWARD VII., A. 1909

STATEMENT giving Names and Stations of Lightkeepers, &c.—*Continued.*NOVA SCOTIA—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.	
			\$	cts.
Port au Pique.....	Sam Creelman.....	May 2, 1901..	25	00
Port Bickerton.....	Theodore O'Hara.....	Jan. 26, 1901..	150	00
Port Felix.....	W. C. Boudrot.....	July 16, 1902..	250	00
Port George.....	Geo. M. Foster.....	Nov. 19, 1897..	100	00
Port Greville Range.....	Ernest A. Hatfield.....	June 29, 1908..	180	00
Pope's Harbour.....	Jas. Bollong.....	Aug. 6, 1877..	300	00
Port Hood.....	J. Allan McDonald.....	May 10, 1880..	280	00
Port Hubert.....	Watson Burgess.....	July 26, 1892..	150	00
Port Mouton.....	J. Oscar Campbell.....	Apr. 29, 1898..	300	00
Port Medway.....	Israel C. Foster.....	Oct. 13, 1892..	260	00
Port Medway Harbour.....	Samuel T. Foster.....	Feb. 17, 1899..	100	00
Port Lorne.....	George D. Corbett.....	May 31, 1904..	260	00
Pubnico.....	Geo. D. Amero.....	Feb. 6, 1893..	240	00
Pugwash.....	Murdock McLeod.....	Dec. 10, 1897..	300	00
Queensport.....	W. E. Ehler.....	Aug. 13, 1906..	300	00
Quaker's Islands.....	Wm. A. Mitchell.....	Feb. 19, 1896..	200	00
Red Island.....	John F. Campbell.....	Nov. 30, 1901..	120	00
*Sable Island Humane Station.....	R. J. Boutillier, supt.....		700	00
St. Ann's.....	Alex. Nicholson.....	June 5, 1905..	140	00
†St. Paul's Island.....	John M. Campbell, supt.....		700	00
St. Esprit.....	Alex. W. Finlayson.....	Apr. 12, 1905..	400	00
St. Paul's Island, West Point.....	John McKenzie.....		400	00
St. Paul's Island Fog Alarm.....	M. J. McLeod.....	July 10, 1906..	500	00
St. Paul's Island, N. E. Point.....	John Rose.....		400	00
Salter's Head.....	Callo Smith.....	June 21, 1888..	60	00
Sambro Light and Fog Alarm.....	Alfred Gilkie.....	Jan. 8, 1867..	800	00
Sambro Harbour Light.....	John H. Findlay.....	Dec. 7, 1899..	100	00
Sambro Inner Island Light.....	Ephraim Smith.....	Jan. 3, 1900..	100	00
Scattarie Light and Fog Alarm.....	John T. Martell.....	July 30, 1897..	800	00
Seal Island Light and Fog Alarm..	John Crowell.....	Oct. 14, 1899..	800	00
Seal Island Pole.....	Simon Joyce.....	July 4, 1884..	150	00
Shafner's Point.....	Jacob W. Roblee.....	May 29, 1897..	150	00
Sheet Rock.....	D. A. McCarthy.....	Jan. 1, 1906..	500	00
Sheet Harbour Passage.....	James Wambolt.....	May 11, 1887..	50	00
Sand Spit (Shelburne Harbour)..	Jas. G. Stephens.....	Mar. 11, 1903..	280	00
Ship Harbour (see Port Tupper).				
Shule Harbour.....	Capt. Clifford Patterson..	Oct. 26, 1905..	200	00
Sissiboo.....	Jas. Amirault.....	July 11, 1899..	200	00
S. E. Beaver Island.....	Theodore Sampson.....	Oct. 13, 1892..	80	00
Spencer's Island.....	Baxter McLellan.....	July 21, 1904..	100	00
Spencer's Point.....	R. A. Spencer.....	Apr. 1, 1870..	125	00
Stoddart's Harbour.....	Ephraim Larkin.....	Mar. 18, 1806..	200	00
Sydney Bar.....	George Nunn.....	June 20, 1872..	300	00
Terrence Bay.....	Samuel P. Slaunwhite.....	Oct. 13, 1903..	100	00
Three Top Island.....	W. L. Munroe.....	" 28, 1879..	325	00
Tor Bay.....	Jas. M. Webber.....	May 10, 1898..	300	00
Troop Point.....	Ralph Troop.....	Jan. 23, 1906..	100	00
Victoria Beach.....	James Hinds.....	Mar. 7, 1901..	100	00
Wallace Harbour.....	George Boyle.....	July 13, 1903..	150	00
Walton Harbour.....	Lewis E. Burgess.....	" 13, 1903..	150	00
Wedge Island.....	Wm. R. Church.....	Mar. 27, 1907..	400	00
West Head Barrington.....	Wm. B. Smith, jun.....	Apr. 12, 1890..	200	00
West Arichat Range, Front Station.	Edward Delory.....	Sept. 1, 1904..	100	00
" " Back Station.....	Michael Gerrior.....	" 1, 1904..	100	00
Westhaver's Island.....	Alfred Strum.....	" 25, 1888..	200	00
Westport.....	E. W. Suthern.....	Apr. 12, 1890..	350	00
Whitehead.....	Capt. Jas. Wells.....	Oct. 20, 1897..	510	00
Whycocomah.....	Murdock Matheson.....	Sept. 11, 1884..	60	00
Wood's Harbour.....	Jas. E. Goodwin.....	Aug. 27, 1900..	200	00
Wolfville.....	J. L. Franklin.....	Apr. 4, 1902..	100	00
Wolf Point.....	Howard Palmer.....	Oct. 14, 1899..	250	00
Yarmouth Harbour (see Bunker Island).				

*With board for self, family and assistants and allowance for salaries of staff. † With 5 boatmen at \$32 per month.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.
NEW BRUNSWICK.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Anderson's Hollow Light.....	Aron B. Copp.....	Mar. 30, 1903..	100 00
Beaver Harbour.....	J. Melvin Eldridge.....	May 2, 1904..	250 00
Beacon (St. John Harbour).....	Wilson Gregg.....	Nov. 4, 1901..	350 00
Bliss Island.....	James H. McLeod.....	Oct. 17, 1900..	375 00
Bathurst.....	Geo. C. Sutherland.....	Mar. 20, 1882..	200 00
Belyea's Point.....	Mrs. Westfield A. Day.....	Nov. 21, 1906..	90 00
Bay du Vin.....	James Chapman.....	July 24, 1882..	200 00
Buctouche Beacon.....	H. B. Robicheaud.....	June 21, 1884..	150 00
" Bar.....	Jadus P. Cormier.....	July 26, 1902..	200 00
Big Duck Island Fog Alarm.....	Rupert Burnham.....	June 25, 1906..	550 00
Bridge's Point Light.....	Robert Upton.....	Sept. 11, 1899..	80 00
Belle Isle (Hatfield's Landing).....	Thos. W. Spragg.....	June 27, 1903..	80 00
Bellony Point.....	Edward H. Egan.....	May 17, 1902..	100 00
Black Lands Gully.....	Urbain Daigle.....	" 28, 1903..	100 00
Cape Enrage Fog Alarm and Light.....	James G. Barbour.....	" 11, 1888..	800 00
Cape Jourimain.....	A. P. Bent.....	Jan. 26, 1901..	300 00
Cape Tormentine.....	J. R. Barry.....	Mar. 26, 1906..	125 00
Caraquet.....	G. Laintaigne.....	June 16, 1888..	200 00
" Lower Light.....	Frederick F. Doucet, jr.....	Oct. 14, 1903..	50 00
" " ".....	Patrice L. Legere.....	" 14, 1903..	50 00
Cox's Point.....	Alexander McBain.....	May 6, 1898..	80 00
Cassie's Point.....	Charles LeBlanc.....	" 4, 1872..	250 00
Cape Spencer.....	Fred. F. Blacklock.....	Mar. 23, 1888..	400 00
Cherry Island Alarm.....	Harry Chaffey.....	Aug. 7, 1903..	150 00
Cocagne Range.....	Dominique Goguen.....	Oct. 14, 1907..	150 00
Church Point (Buctouche).....	D. O. Maillett.....	July 7, 1883..	150 00
Dalhousie.....	James Arseneaux.....	June 18, 1894..	100 00
Dipper Harbour.....	Fenwick Belmore.....	Mar. 12, 1895..	100 00
Douglas Island and P.W. Montgomery's Isld.	Henry McNeil.....	Jan. 1, 1880..	250 00
East Hd. Musquash.....	Chas. P. Hamm.....	" 14, 1879..	300 00
Escuminac Alarm and Light.....	Kenneth R. McLennan.....	Mar. 7, 1892..	750 00
Fox Island, Upper, and Light.....	Seymour Williston.....	June 4, 1902..	300 00
" Lower.....	George Mills.....	" 23, 1897..	200 00
Fanjoy's Point.....	William Fanjoy.....	Dec. 15, 1897..	80 00
Flewelling's Wharf.....	Mary Flewelling.....	April 12, 1890..	80 00
Fort Folly.....	Amos P. Belliveau.....	June 23, 1903..	225 80
Gagetown.....	Fraser Fox.....	April 22, 1904..	80 00
Grindstone Island Alarm.....	James R. Russell.....	Jan. 13, 1899..	700 00
Gannet Rock.....	Coleman Dalzell.....	July 1, 1904..	550 00
".....	Thomas Butler, Asst.....	May 1, 1907..	460 00
Green Head.....	Thos. E. Looney.....	July 14, 1886..	200 00
Grant's Beach.....	John Delaney.....	Oct. 7, 1880..	125 00
Gull Cove.....	Lewis Frankland.....	Nov. 14, 1902..	100 00
Goose Lake.....	John D. Brune.....	May 11, 1888..	*250 00
Grand Harbour.....	Lloyd C. Dakin.....	" 2, 1904..	400 00
Grand Manan Fog Alarm.....	George T. Tatton.....	Oct. 16, 1866..	750 00
Gray's Landing.....	B. F. McCutcheon.....	Mar. 6, 1907..	70 00
Head Harbour Light and Fog Alarm.....	Warren Fitzgerald.....	June 29, 1904..	300 00
Heron Island.....	John A. D. Robertson.....	April 1, 1902..	200 00
Hendry's Farm Washedemoak Light.....	Miss A. M. Hendry.....	Mar. 15, 1899..	80 00
Hay Island.....	Joseph Allain.....	May 21, 1895..	150 00
Harper's Point.....	Lawrence Blakley.....	Sept. 9, 1887..	75 00
Hampstead.....	Edgar B. Palmer.....	Nov. 6, 1900..	80 00
Indian Point.....	John De Grace.....	June 4, 1889..	150 00
Jemseg.....	Geo. F. Nevers.....	Nov. 24, 1884..	80 00
Letete Fog Alarm.....	Sydney Dines.....	Mar. 27, 1907..	580 00
Letete Light.....	Sydney Dines.....	" 26, 1907..	50 00
Light Ship (Miramichi).....	Capt. Robt. McLean.....	April 12, 1902..	**700 00
Little Belledune (Miscou Gully).....	J. A. Roberty.....	Feb. 21, 1905..	250 00
Little Shippigan.....	Robt. McConnell, jr.....	Sept. 9, 1887..	100 00
Long Point Bellisle Lt.....	James A. Bates.....	June 1, 1907..	80 00
Machias Seal Island Light and Fog Alarm.....	W. L. Harvey.....	July 8, 1904..	1,000 00
Midgie Bluff Light.....	Arthur Henderson.....	Oct. 4, 1894..	200 00

* Allowance of \$300 for assistance. ** With board for self, family and assistants and salaries of staff.

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.
NEW BRUNSWICK—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Miscou.....	Joseph L. Robichaud.....	Nov. 11, 1902..	800 00
Musquash.....	R. P. McDonald.....	Jan. 28, 1901..	80 00
Middle Island.....	Michael Murray.....	April 10, 1902..	200 00
Mark's Point.....	Wm. Maloney.....	Nov. 7, 1903..	120 00
McMann's Point.....	Harvey R. McMann.....	Jan. 2, 1901..	80 00
Mulholland's Point.....	Alvin Parker.....	June 13, 1901..	200 00
Neguac.....	John Robinson.....	" 30, 1893..	240 00
Neguac Range.....	Chas. McIntosh.....	Dec. 10, 1892..	100 00
Negro Head Submarine Bell.....	Alfred Spence.....		250 00
Negro Town Point.....	E. Ross.....	Mar. 5, 1878..	400 00
Newcastle.....	Blackstock Matheson.....	April 18, 1898..	100 00
Oak Point, St. John River Light.....	Mrs. Bessie May Francombe.....	Dec. 20, 1907..	80 00
Oromocto Shoals Light.....	R. Brennan.....	Mar. 18, 1903..	80 00
Oak Point (Miramichi) Light.....	John Bowie.....	June 2, 1906..	100 00
Partridge Island Light and Fog Alarm.....	Hugh Andrews.....	May 1, 1906..	1,200 00
Pokemouche Light.....	Michael Hayden.....	Oct. 17, 1888..	300 00
Portage Island.....	Peter Morrison, Jr.....	May 17, 1892..	300 00
Pt. Lepreaux.....	Robert L. Belding.....	June 30, 1905..	450 00
Pt. Lepreaux Fog Alarm.....	Frank Frauley.....	" 30, 1905..	900 00
Pea Point Light.....	Elias C. Dickson.....	Nov. 16, 1898..	250 00
Passamaquoddy Bay Light, West.....	Joseph Kilpatrick.....	Feb. 3, 1898..	450 00
" " East.....	Theobald Rooney.....	Jan. 1, 1896..	350 00
Preston's Beach.....	Stanislaus Preston.....	July 11, 1889..	125 00
Petit Rocher	J. B. Boudreau.....	Feb. 26, 1896..	150 00
Poquesuide Light.....	Octave Hachey.....	July 12, 1881..	180 00
Palmer's Point.....	Robert E. Pickett.....	May 11, 1897..	80 00
Pointe Brulee.....	Frank Gould.....	Jan. 13, 1899..	70 00
Pointe du Chene.....	Thomas Harts.....	Feb. 17, 1905..	80 00
Pointe Sapin.....	Victor Daigle.....	May 28, 1903..	25 00
Perry's Point	John Carney.....	Sept. 25, 1900..	80 00
Quaco.....	Charles Brown.....	Nov. 25, 1884..	400 00
" Breakwater.....	Fred M. Cochran.....	Mar. 25, 1892..	100 00
" Fog Alarm.....	L. B. Bradshaw.....	Aug. 2, 1887..	400 00
Robertson's Point.....	Chas. W. Robertson.....	June 30, 1897..	80 00
Richibucto.....	Peter F. Richard.....	May 30, 1895..	185 00
" Beacon.....	Jude Robichaud.....	June 16, 1902..	200 00
" Bar.....	Joseph F. Richard.....	June 16, 1902..	150 00
Railway Wharf, Moffat's Ledge.....	Geo. Cumming.....	Jan. 1, 1880..	100 00
South Tracadie.....	Wm. C. Ferguson.....	Mar. 23, 1898..	150 00
Swallow Tail.....	Geo. Y. Dalzell.....	Mar. 18, 1893..	400 00
St. Andrew's.....	W. J. Pendlebury.....	April 10, 1889..	250 00
Spruce Point.....	Bertie G. Hannah.....	Sept. 15, 1892..	120 00
Sand Point.....	Richard Wagner.....	June 7, 1883..	80 00
Shediac.....	M. Robinson.....	Dec. 29, 1873..	250 00
Southern Wolf.....	Ethelbert Wright.....	Mar. 6, 1906..	500 00
Shippigan.....	Adelard Savoie.....	April 2, 1906..	350 00
Sheldrake Island.....	Duncan Morrison.....	Feb. 25, 1880..	300 00
Scuth West Head.....	Clyde S. Ingersoll.....	July 10, 1907..	500 00
Stonehaven.....	Mrs. Elizabeth Scott.....	July 8, 1904..	100 00
The Cedars.....	Forrest Williams.....	May 11, 1897..	80 00
Tracadie.....	Fabien D. Basque.....	Aug. 20, 1904..	275 00
Tiner's Point Fog Alarm.....	Alfred Splane.....	Aug. 21, 1905..	750 00
Wilmot's Bluff.....	J. H. True.....	Sept. 12, 1899..	80 00
Ward's Point.....	Edwin Lockhart.....	Oct. 20, 1903..	80 00
Washademoak Lake.....	See Hendry's Farm.....		

BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC.

Algernon Rock.....	Geo. Leclere.....	July 30, 1901..	200 00
Amherst Island.....	Wm. Cormier.....	April 26, 1871..	350 00
Anticosti, east point.....	Christopher Hubert.....	July 27, 1907..	600 00
Anse St. Jean.....	F. Lavoie	Mar. 13, 1889..	40 00

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Lightkeepers, &c.—*Continued.*
BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.	
			\$	cts.
Anticosti, south point.....	Emile Laprise.....	April 18, 1903..	800	00
" south-west point.....	Z. Lemieux.....	July 10, 1900..	700	00
" west point.....	Alf. Malouin.....	July 1, 1877..	850	00
Ash and Bloody Islands Range.....	Jas. Alex. McGee.....	May 26, 1903..	200	00
Barachois de Malbaie.....	F. X. Lemieux.....	Mar. 6, 1903..	60	00
Barre à Boulard.....	Nap. Daigle.....	May 28, 1904..	200	00
" ".....	Phileas Abel.....	June 23, 1903..	75	00
Batiscan "F".....	L. Fugère.....	April 29, 1868..	80	00
" "B".....	Jos. L. Brunelle.....	April 27, 1905..	80	00
Becancour "F".....	Omer Gingras.....	Oct. 24, 1905..	150	00
" "B".....	A. Tourigny.....	Oct. 24, 1905..	100	00
Bellechasse.....	Jos. Bilodeau.....	June 15, 1903..	350	00
Belle Isle.....	Jean Louis Thibadeau.....	Oct. 25, 1907..	1,600	00
" north-east point.....	Paul Thomas.....	July 8, 1904..	1,100	00
Belle River Park.....	Chas. Roy.....	Aug. 5, 1904..	200	00
Bersimis.....	Henri Grenier.....	Aug. 8, 1903..	100	00
Bicquette.....	Louis Pinault.....	Oct. 6, 1900..	700	00
Bird Rocks.....	W. Bourque.....	Nov. 15, 1905..	1,300	00
Boucherville.....	Hiliodore Carrière.....	Aug. 26, 1903..	80	00
Brandy Pots.....	Alphonse Richard.....	Oct. 7, 1878..	400	00
Bryon Island.....	Procule Chevrier.....	June 23, 1905..	400	00
Cap aux Corbeaux.....	Edward Coudé.....	Oct. 26, 1905..	70	00
Cap au Saumon.....	Louis Bouchard.....	May 16, 1896..	600	00
Cap aux Oies.....	Capt. Thos. Tremblay.....	May 1, 1888..	250	00
Cap Bauld.....	Edmond Fontaine.....	Sept. 1, 1905..	800	00
Cap Charles "B".....	Amédée Baron.....	June 26, 1901..	90	00
" "F".....	Alcide Boisvert.....	July 26, 1901..	150	00
Cap Chatte.....	Luc Côté.....	Dec. 3, 1901..	500	00
Cape Despair.....	Charles Bourget.....	Nov. 1, 1897..	400	00
Cape Gaspé.....	Frs. Le Huquet.....	Oct. 22, 1896..	650	00
Cap Magdeleine "B".....	J. F. Sasseville.....	June 9, 1886..	700	00
" (A) "F".....	Moise Hebert.....	May 11, 1888..	80	00
" (A) "B".....	G. Vaillancourt.....	Oct. 1, 1906..	100	00
" "F".....	Pierre Toupin.....	April 26, 1905..	80	00
" Upper Lts. B.....	Elzéar Beaunier.....	Oct. 1, 1905..	100	00
" Village Range.....	Ernest Lacourse.....	Mar. 13, 1906..	200	00
Cap Norman.....	J. W. Campbell.....	April 12, 1890..	720	00
Cape Ray.....	E. H. Rennie.....	Oct. 19, 1884..	800	00
Cap Rosier.....	Eug. Costin.....	Nov. 4, 1890..	800	00
Carleton Point.....	Louis Bujoid.....	May 25, 1899..	300	00
" Wharf.....	Francis Cullen.....	July 12, 1907..	75	00
Champlain "B".....	Louis Bertrand.....	Sept. 12, 1902..	60	00
" "F".....	Philippe L. Carignan.....	Oct. 1, 1902..	80	00
Chambly Basin Range Lights.....	Jos. de Senneville.....	May 23, 1907..	150	00
Chambly Canton Range Wharf.....	Joseph Savage.....	July 10, 1907..	225	00
<i>Chicoutimi Lights--</i>				
Chicoutimi Wharf.....	André Harvey.....	May 30, 1889..	40	00
Riviere Caribou "B".....	H. Simard.....	Mar. 1, 1905..	50	00
" "F".....	John Savard.....	Mar. 1, 1905..	50	00
Riviere du Moulin "B".....	Luce Gourdeau.....	May 9, 1905..	50	00
" "F".....	George Tremblay.....	Sept. 19, 1899..	50	00
Riviere Valin (Range).....	Maximin Lavoie.....	Summer, 1893..	80	00
Savard's Valin (Range).....	Dorilas Savard.....	July 18, 1904..	80	00
Poste St. Martin "F".....	Alfred Pilote.....	April 22, 1907..	50	00
" "B".....	Frs. Gauthier.....	April 22, 1907..	62	50
Chlorydorme.....	Magloire Coulombe.....	Oct. 15, 1904..	100	00
Contrecoeur Course "B".....	Norbet Duval.....	April 22, 1904..	100	00
" "F".....	Joseph Arpin.....	Sept. 12, 1902..	100	00
" Traverse "B".....	Alfred Lacroix.....	July 26, 1904..	100	00
" "F".....	Joseph Alcidas Lacroix.....	April 14, 1904..	75	00
" "St. Ours.....	J. B. Laporte.....	April 26, 1904..	125	00
" Verchères "B".....	Ernest Guyon.....	Nov. 11, 1904..	125	00
" "F".....	Honoré Tetrault.....	" ".....	125	00
Crane Island.....	Désiré Vézina.....	April 25, 1904..	355	00

8-9 EDWARD VII., A. 1909

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.
BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Domaine F. Range.....	Edward Gerard.....	May 30, 1908..	80 00
Domaine B. Range.....	Xavier Emond..	" "	80 00
Duthies Pt.	B. W. Willett.....	Oct. 16, 1903..	60 00
Eboulements.....	Wilfrid Bouchard.....	April 25, 1906..	50 00
Egg Island.....	Tancrède Pelletier ..	July 1, 1901..	500 00
Entry Island.....	Geo. F. Cullins.....	*July 30, 1901..	*250 00
Etang du Nord.....	Nectaire Arsenau.....	July 21, 1891..	350 00
Escoumains Range Lts.....	Saguenay Lumber Co..	Sept. 10, 1906..	150 00
Fame Pt.....	Jas. Ascah.....	Sept. 22, 1880..	1,100 00
Father Point.....	Jno. McWilliams.....	May, 20, 1893..	450 00
Father Pt. Fog Alarm.....	J. G. Blanchet.....	July 21, 1904..	800 00
Flower Island.....	Jos. Lavallée.....	April 12, 1905..	600 00
Forteau.....	Thos. Wyatt.....	Oct. 18, 1889..	1,100 00
Fox River..	André Samuel ..	Oct. 15, 1904..	100 00
Gallia Bay Upper Range.....	Elz. Cantara.....	May, 3, 1907..	350 00
Gallia Bay Lower Range..	Louis Peloquin.....	" "	350 00
Gascons Wharf.....	John Maurant.....	June 8, 1906..	75 00
Gaspé Basin.....	William Lindsay.....	June 14, 1900 ..	42 00
Gentilly "B".....	Delphis Mailhot ..	April 2, 1907..	150 00
Gentilly "F".....	Adolphe Lebleu.....	April 6, 1907..	250 00
Grande Entrée.....	Andre Turbide.....	" "	50 00
Grande Rivière.....	Wilham Bisson.....	Oct. 22, 1896..	150 00
Grand Vallée.....	A. Fournier ..	April 14, 1900..	100 00
Green Island	R. W. Lindsay..	Sept. 28, 1888 ..	650 00
Greenby Island.....	Octave Dubois.....	Oct. 12, 1903..	1,100 00
Griffons Cove.....	Alfred Morin ..	Oct. 15, 1904..	100 00
Grondines "B".....	Jos. Sauvageau.....	June 20, 1904..	100 00
" "F".....	Eugène Mayrand.....	" "	125 00
Grondines Pt. "B".....	Emile Houde.....	" "	100 00
" "F".....	Achille Sauvageau ..	" 1906..	250 00
Grosse Roche.....	Nazaire Morin.....	June 25, 1906..	500 00
Guard Pier.....	Benj. Rodier.....	Sept. 10, 1907..	500 00
Hochelaga "R".....	Alphonse Chartier ..	Aug. 5, 1904..	200 00
Ile Ronde	Herman Chartrand..	Aug. 1, 1907..	500 00
Ile à la Bague.....	Louis Dubois.....	April 14, 1903..	150 00
Ile à Aigle "B".....	Eug. Savarie.....	May 1, 1903..	100 00
Ile à Aigle "F".....	F. X. Lapointe.....	" "	100 00
Ile aux Courdres..	Eustache Boudreault..	April 20, 1906..	40 00
Ile des Barques	Omar Salvail ..	May 6, 1897..	250 00
Ile de Grace "B".....	Louis Letendre.....	April 1, 1906..	100 00
" "F".....	Ed. Paul.....	Sept. 7, 1871..	240 00
Ile du Pads Range.....	Zotique Courscheine ..	Aug. 8, 1907..	275 00
Ile du Moine "B".....	Paul Mongeau.....	Dec. 27, 1906..	125 00
" "F".....	Etienne Provencal.....	Dec. 27, 1906..	100 00
Ile aux Raisins Range.....	Louis Boucher.....	April 13, 1893..	240 00
Ile Bouchard.....	Alphonse Chicoine.....	June 16, 1903..	80 00
Ile Deslauriers.....	Nap. Langevin.....	Dec. 18, 1906..	120 00
Ile Marie.....	Ivon Laporte.....	April 21, 1902..	120 00
Ile Ste. Thérèse (Upper Range).....	Sam Reeves.....	Oct. 12, 1870..	270 00
Ile des Lauriers "F".....	Phillippe Choquet ..	March 13, 1908..	80 00
Ile Ste. Thérèse (Lower Range).....	Jos. Malo.....	Feb. 1, 1897..	130 00
Ile auBélier Lac St. Jean.....	Wm. Gaudreault.....	Oct. 30, 1901..	100 00
Kamouraska.....	Arthur Levesque.....	Feb. 19, 1901..	400 00
Lacolle.....	W. G. Whitman.....	Jan. 18, 1904..	150 00
Lanoraie Crossing.....	Jos. Ducharme.....	April 18, 1904..	100 00
Louisville Range Lts.....	Onésime Plante.....	June 23, 1907..	150 00
Longue Pointe Traverse "R".....	James Fletcher.....	May 16, 1904..	125 00
Lake Memphremagog.			
Green Point.....	Jas. P. H. Peters.....	June 1, 1891..	**1 50
Lead Mines	W. Wheeler.....	" "	**2 50
Molson's Island	Mrs. A. Molson.....	Season 1878..	†2 50
Georgeville.....	C. E. Martel ..	May 19, 1905..	†1 50
Wadleigh Pt.....	J. A. Patterson.....	June 1, 1891..	†1 50

* Allowance of \$30.00 for fuel. ** Per week during Season of Navigation and \$75.00 for horsekeep.
*** \$2.50 per week during season of Navigation. † A week during Season of Navigation. ‡ A week during Season of Navigation and \$75.00 for horsekeep.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Lightkeepers, &c.—*Continued.*
BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Lark Islet.....	W. Boulianne.....	Sept. 1, 1872..	400 00
Lavaltrie (Range).....	Denis Giguère ..	May 24, 1870..	300 00
Lake St. Peter Lt. Ship No. 1.....	Desiré Laffèche.....	April 12, 1887..	450 00
" " " 2.....	Hector Fiset.....	April 22, 1875 ..	500 00
" " " 3.....	J. B. Weaner.....	§May 9, 1904..	400 00
L'Islet Richelieu.....	Alp. Auger.....	Jan. 20, 1905..	150 00
Lotbinière "B".....	George Beaudet.....	Jan. 4, 1883 ..	80 00
" " " "F".....	Mrs. L. Beaudet.....	Sept. 3, 1903..	80 00
Lower Traverse Pier.....	Alph. Caron.....	April 22, 1904..	++ ..
Magpie "R".....	Albert Dupuis.....	Sept. 14, 1907..	75 00
Maquereau Point.....	A. Bertrand.....	Dec. 21, 1877..	300 00
Martin River.....	Aug. Leclere.....	Sept. 3, 1902..	300 00
Matane.....	Jos. Banville ..	Feb. 1, 1897..	300 00
Metis.....	Elisée Caron.....	Mar. 28, 1906..	300 00
Montée du Lac (Range).....	W. Labianche.....	May 2, 1905..	400 00
Mont Louis.....	Ls. Letourneau..	" 22, 1906..	100 00
Montmagny.....	Capt. H. Boulanger.....	April 13, 1878..	80 00
Murray Bay.....	Henry Girard.....	*July 13, 1903..	50 00
Natashquan.....	Elie Landry ..	" 28, 1906..	250 00
Newport.....	Solomon Grenier.....	June 3, 1897..	150 00
Nicolet Range "B".....	Edmond Heroux.....	Dec. 5, 1906..	100 00
" " " "F".....	Didier Heroux.....	" 5, 1906..	150 00
North Half Way Point (Range).....	Jos. Lord.....	May 5, 1903..	170 00
Oak Point.....	Thos. Harper.....	Jan. 1, 1907..	100 00
<i>Orleans Range</i>			
Ange Gardien "B".....	Oliver Paré.....	Nov. 10, 1902..	70 00
" " " "F".....	F. Gagné.....	" 10, 1902..	70 00
Ste. Famille "B".....	Pierre Pâquet.....	Oct. 19, 1885..	70 00
" " " "F".....	Alfred Poulin..	" 26, 1896..	70 00
St. Pierre "B".....	Honoré Roberge ..	" 19, 1885..	70 00
" " " "F".....	Jacques Roberge.....	May 13, 1908..	60 00
" " " "F".....	Oliver Vezina.....	Oct. 28, 1897..	70 00
Paspebiac.....	John Loisel.....	Aug. 27, 1894..	150 00
Percé.....	Florian Bourget..	Mar. 18, 1893..	200 00
Perroquet.....	Placide Vigneau ..	Sept. 19, 1892..	625 00
Petite Traverse (Contrecoeur) "B".....	Ed. St. Laurent....	April 22, 1904..	100 00
" " " "F".....	Louis Caisse ..	" 22, 1904..	100 00
Pilgrims.....	H. Morin.....	" 29, 1898..	340 00
Pillars.....	Geo. Leclere.....	July 30, 1901..	450 00
Plateau.....	Geo. St. Croix ..	Oct. 22, 1896..	450 00
Platon (Range).....	Chas. Beaudet.....	Aug. 24, 1894..	120 00
Pte à Basile "B".....	Antonio Demers ..	July 22, 1904..	130 00
" " " "F".....	Elzéar Douville.....	Feb. 6, 1904..	130 00
Pte à Garde Light-ship.....	Chas. Brown.....	June 26, 1904..	320 00
" aux Citrouilles.....	Widow F. Marchand...	July 3, 1906..	200 00
" Orignaux.....	Dominique Levesque...	Oct. 5, 1903..	350 00
" Bléue.....	Armand Tessier.....	June 9, 1904..	40 00
" de Monts.....	Victor Fafard.....	Aug. 1, 1889..	650 00
" Lac.....	Sylvis Paquin. .	May 2, 1900..	100 00
" Echouerie.....	Pitre Bourdage ..	July 25, 1903..	100 00
" Noire.....	J. E. Boulainne.....	Jan. 18, 1904..	200 00
" Riche.....	N. Breton ..	May 16, 1896..	500 00
" St. Jean.....	Ls. Lachance.....	Sept. 26, 1896..	300 00
" St. Laurent.....	Joachim Godbout.....	April 15, 1904..	300 00
Port Daniel.....	F. X. Langlois.....	Feb. 22, 1907..	60 00
" West.....	Arthur Horrie ..	Jan. 1, 1907..	100 00
Portneuf (a) Range.....	Josephine Rodrique...	Dec. —, 1900..	250 00
" " below.....	Pierre Poitras ..	Oct. 16, 1904..	100 00
" " ".....	Edmond Tremblay.....	May 7, 1903..	300 00
Point aux Esquimaux ..	Joseph F. Boudreault..	Oct. 29, 1907..	100 00
Port St. Francois (Range).....	Fis. Manseau.....	Mar. 27, 1900..	240 00

++ Gas buoy temporarily placed. New lighthouse not yet built. Payment of Lightkeeper suspended.

§ Temporary keeper.

* Now lit by electricity. Services of keeper dispensed with, Dec. 31, 1907.

8-9 EDWARD VII., A. 1909

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.
BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—Concluded.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Quebec Harbour..	Harbour Commission ..		66 00
Red Island Lighthouse..	P. T. Fraser	April 12, 1890..	450 00
Repentigny "B"	L. L. Rivet.....	" 28, 1894..	75 00
" "F"	J. Bte. Lachapelle	Feb. 1, 1861..	75 00
Rimouski	Ubalde Lavoie.....	May 22, 1906..	50 00
Riviere à la Pipe.....	Alex. Morin.	Oct. 3, 1901..	62 50
" du Chêne.....	Ant. Langlois.....	July 11, 1888..	125 00
" du Loup.....	F. E. Gilbert	Sept. 22, 1902..	70 00
" St. Francois.....	Phileas Desmarais.....	July 2, 1897..	*20 00
Roberval... ..	Electric Light Co.....	June 28, 1898..	100 00
Sand Beach.....	Thomas Kennedy.....	Aug. 9, 1904..	400 00
St. Alphonse.....	Pitre Tremblay.....	June 19, 1895..	40 00
St. Antoine.....	Mrs. Nap. Bergeron	March 4, 1902..	80 00
"	Francois Doré.....	April 14, 1903..	120 00
St. Siméon	Henry Savard.. ..	Oct. 25, 1906..	40 00
Ste. Anne des Monts.....	X. Lafrancois.....	" 15, 1904..	100 00
Sté. Anne de Sorel "B"	Frs. Lanceault.....	Mar. 28, 1906..	100 00
" " "F"	Pierre Cournoyer	" 28, 1906..	100 00
Ste. Croix.....	Willie A. Thurber.....	" 28, 1901..	175 00
" Bar.....	Telesphore Corteau.....	" 28, 1901..	70 00
Ste. Croix.....	Widow D. Racette.....	Dec. —, 1900..	70 00
Ste. Emélie, Back Light.....	Emery Filteau.	Mar. 16, 1905..	80 00
" Front Light.....	A. Laliberte.....	Sept. 24, 1888..	90 00
Ste. Francois, I.O. "F"	Jos. Lepage	April 20, 1876..	75 00
" " "B"	Ls. Marceau.....	" 1, 1884..	75 00
Ste. Petronille, I.O.....	Nap. Ferland	Sept. 3, 1904..	250 00
St. Pierre les Becquets.....	Henri Perreault	May 26, 1901..	70 00
Ste. Felicité Fog Alarm.....	Frs. Belanger.....	Jan. 14, 1905..	600 00
St. Valentin Range.....	Paul Martin.....	April 28, 1873..	150 00
Seven Islands.....	Alfred Arcand	May 20, 1898..	880 00
St. Anne Range "F"	Cezare Duffour.....	" 21, 1908..	60 00
" " "B"	Alphonse Poulin	" 21, 1908..	60 00
Sorel Harbour.....	R. & O. Nav. Co. Assistant..	Sept. 6, 1854..	**85 00
Trois Pistoles.....	Cyrille LeBel	Oct. 25, 1907..	80 00
Three Rivers ..	M. G. W. Luckerhoff.	Aug. 10, 1908..	†120 00
Upper Traverse Pier...	Alfred Fournier.....	April 14, 1900..	600 00
Upper Champlain Basin "B"	Louis Pothier.....	" 1, 1906..	100 00
" " "F"	Joseph Massicotte.....	" 1, 1906..	100 00
Varennes.....	Azarie Geoffrion.....	May , 1903..	70 00
Verchères Traverse, "B"	Phileas Charbonneau.....	April 21, 1902..	70 00
" " "F"	F. X. Chicoine.....	" 21, 1902..	80 00
Verchères Village, "B"	Felix Bourquet	" 21, 1902..	70 00
" " "F"	Joseph Guyon.....	" 21, 1902..	80 00

ABOVE MONTREAL.

Aylmer.....	Francis Boucher.....	May 3, 1907..	175 00
Arnprior Island (Lower).....	William Kilroy.	Oct. 1, 1905..	150 00
Allumette Island (Lower).....	John Manders.....	Aug. 7, 1907..	100 00
"	John Cox.	June 22, 1887..	100 00
Bamford Island.....	Robert Bamford.....	" 21, 1888..	250 00
Barriefield Common Range.....	William Murray... ..	May 17, 1900..	150 00
Baskin's Wharf.....	Silas Sullivan.....	Dec. 22, 1896..	130 00
Battle Island.....	C. S. McKay.....	Aug. 27, 1877..	500 00
Beauharnois.....	Alphonse Dault.....	April 14, 1903..	260 00
Belleville	J. C. Weir.....	" 4, 1901..	200 00
Blind River Range.....	Michigan Land & Lumber Co.....		80 00
Boyd Island (see Spanish River).			
Bois Blanc.....	Agnes Hackett.	June 22, 1901..	435 00

*\$20 per month during season of navigation. **Continued from "Trinity House." †Temporarily at \$120 per annum with \$10 per annum increase to maximum of \$160.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.
ABOVE MONTREAL—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Black Bear Island.....	Daniel Matheson.....	June 22, 1899..	200 00
Brown's or Knapp's Pt.....	Jos. J. Brophy.....	May 9, 1905..	180 00
Bishop's Bay.....	George McPherson.....	Mar. 28, 1904..	150 00
Bronte.....	Chas. Osborne.....	Oct. 20, 1906..	250 00
Buckom's Point.....	Godfrey Ouillet.....	Feb. 23, 1884..	200 00
Burlington Beach.....	Thomas Lundy.....	May 2, 1905..	450 00
Byng Inlet.....	Louis Lamondin.....	July 20, 1901..	375 00
Cabot Head.....	Charles Webster.....	May 10, 1898..	650 00
Campbell Island.....	Robert Wilson.....	Jan. 8, 1905..	150 00
Caribou Island.....	Antoine Boucher.....	May 3, 1907..	1,000 00
Cape Robert.....	N. Matheson.....	Oct. 2, 1896..	350 00
Cape Croker.....	R. Chapman.....	Nov. 13, 1902..	1,050 00
Caron Point.....	Honoré Sauvé.....	May 1, 1889..	60 00
Cox Reef, Man.....	John Thomas.....	†Mar. 6, 1906..	350 00
Centre Brothers Island.....	D. Wemp.....	Jan. 9, 1901..	200 00
Chantry Island.....	Malcolm McIver.....	April 1, 1907..	500 00
Cherry Island.....	I. S. Johnson.....	Nov. 5, 1883..	300 00
Christian Island.....	Allan Collins.....	Mar. 25, 1891..	435 00
Clapperton Island.....	Henry F. Baker.....	Dec. 2, 1895..	350 00
Cobourg.....	Robert Gorden.....	May 16, 1883..	180 00
Cockburn Island.....	John McKay.....	July 1, 1906..	50 00
Colchester Reef.....	John Manson.....	May 1, 1888..	870 00
Coal's Shoal.....	R. P. Boyd.....	April 9, 1884..	250 00
Collingwood.....	Jas. W. Lunan.....	Jan. 2, 1904..	370 00
Coppermine Point.....	J. J. Rosseau.....	June 27, 1904..	100 00
Corby Point.....	Joseph Davieau.....	May 27, 1899..	350 00
Cornwall Canal and Hamilton Range.....	Remi Casgraine.....	April 1, 1906..	300 00
Corunna.....	W. J. Scott.....	" 23, 1901..	120 00
Coteau Landing.....	Thos. Filiatreault.....	May 27, 1890..	140 00
Coulouge Lake.....	Felix Bertrand.....	April 2, 1892..	100 00
Deep River Island.....	Louis Labelle.....	".....	100 00
Deseronto.....	Rathbun Company.....	Oct. 14, 1884..	200 00
Dorval.....	Benjamin Cloude.....	Aug. 1, 1907..	300 00
False Ducks.....	Darland Dulmage.....	May 19, 1903..	700 00
Flower Pot Island.....	John Parker.....	" 3, 1907..	300 00
Fort William, Lake Superior.....	John Armstrong.....	April 28, 1894..	300 00
Upper Ottawa.....	Jas. McCool, sr.....	May 23, 1887..	90 00
Frenchman's Bay.....	Wm. O'Brien.....	April 14, 1904..	125 00
French River.....	Mrs. E. B. Borron.....	Jan. 20, 1903..	500 00
*Fox Island, Lake Simcoe.....	John Prosser.....	Sept. 14, 1896..	250 00
Gananoque Narrows and Jackstraw Shoal.....	Mrs. Manly Cross.....	Jan. 2, 1908..	550 00
Gargantua.....	Louis Miron.....	Oct. 26, 1899..	450 00
Giant's Tomb.....	A. H. Griffith.....	Sept. 17, 1898..	300 00
Gibraltar Point.....	P. J. McSherry.....	May 2, 1905..	400 00
Gin Island.....	W. J. Baxter.....	" 23, 1885..	400 00
Goderich.....	Robert Campbell.....	June 9, 1886..	400 00
Gore Bay.....	Angus Matheson.....	July 10, 1903..	350 00
Gravenhurst.....	Isaac Barnes.....	Mar. 20, 1906..	100 00
Graham Front.....	W. Graham.....	Dec. 19, 1904..	75 00
" Back.....	X. Sicard.....	April 29, 1905..	75 00
Great Duck Island.....	John Purvis.....	May 9, 1898..	700 00
Green Shoal.....	Albert Laberge.....	" 20, 1902..	200 00
Grenadier Island.....	Albert Root.....	Dec. 15, 1863..	250 00
Griffith Island.....	W. T. Boyd.....	May 14, 1889..	400 00
Grosse Point.....	William Shannon.....	Sept. 27, 1866..	435 00
".....	George Shannon.....	" 27, 1866..	175 00
Gull Island.....	James Roddick.....	" 7, 1907..	500 00
Gull Harbour.....	Thor. Fjeldstedt.....	May 6, 1904..	180 00
George's Island (Lake Winnipeg).....	Chas. T. Whiteway.....	June 16, 1906..	*155 00
Hope Island.....	Charles Vallée.....	April 20, 1899..	450 00
Hooper's Point.....	Jonathan Morrison.....	Mar. 24, 1898..	200 00
Isle of Coves.....	Kenneth McLeod.....	June 19, 1903..	750 00

†Retired June 11, 1908. Wm. Doré appointed June 11, 1908.

*With annual increase of \$15 to maximum of \$400.

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.
ABOVE MONTREAL.—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.	
			\$	cts.
Isle Perrot	And. McNabb	May 20, 1905.	100	00
Jones Island, Georgian Bay.....	Ed. Taylor	June 3, 1901..	800	00
" Range, Ottawa River.....	John Paquette	April 13, 1893..	150	00
Kagawong.....	W. U. Boyd.....		72	00
Killarney	Frank Roque.....	Feb. 28, 1905..	400	00
Kincardine.....	Thos. McGaw, jr.....	June 13, 1899..	400	00
Kingsville.. ..	W. H. Black.....	July 27, 1902..	150	00
Kitchener Island.....	P. J. Sullivan.....	Oct. 25, 1907..	400	00
Lake Cecebe.....	John Shade.....	Aug. 29, 1906..	250	00
Lamb Island.....	Andrew Alexander.....	April 26, 1897..	500	00
Lancaster Bar	J. J. Munroe.....	June 8, 1892..	*400	00
Lancaster Pier.....	J. J. Munro	July 1, 1907..		
Leamington.....	F. H. C. Conover	April 28, 1883..	150	00
Lime Kiln Crossing.....	Stephen Pettypiece	May 11, 1888..	350	00
Lion's Head	Charles Knapp.....	Oct. 28, 1903..	75	00
Little Current.....	David Boyter.....	April 22, 1903..	350	00
Little Gros Cap.....	W. T. Richardson.....	Sept. 27, 1900..	200	00
Lonely Island.....	Jean Haitse.....	May 11, 1885..	500	00
Long Point, east end.....	S. B. Cook.....	June 9, 1897..	700	00
" west end.....	F. E. Mason	" 3, 1901..	400	00
L'Original.....	Gregoire Seguin	May 8, 1894..	100	00
Lower Narrows.....	J. B. Leblanc.....	Jan. 4, 1904..	100	00
Lyal Island	John McKay	Oct. 27, 1884..	450	00
Manitoulin Island	J. H. Ball	May 7, 1900..	750	00
Manitowaning.....	John Gourley, jr.....	July 3, 1900..	150	00
Meaford.....	Samuel Dutcher	May 7, 1877..	200	00
Michipicoten Island	Hyacinthe Davieau.....	July 1, 1881..	400	00
Middle Island	John L. Lidwell, jr.....	" 10, 1889..	350	00
Middle Range.....	Nap. Somers.....	June 19, 1900..	200	00
Mississagua Island.....	L. D. McDonald.....	May 16, 1896..	450	00
Mohawk	R. O. Smithers.....	March 31, 1896..	400	00
McKay's	Joseph Harvey	July 10, 1907..	300	00
McKie's Point.....	Dosithée Daoust.....	Sept, 21, 1893..	175	00
McQuestion Point.....	Elizabeth McLeod.....	Feb. 22, 1904..	100	00
McTavish	J. Campbell.....	Nov. 18, 1896..	100	00
Narrow Island.....	A. B. Boyter.....	Jan. 3, 1898..	250	00
Nine Mile Point	Stannes Veech	Mar. 7, 1894..	450	00
"	Andrew McMaster	April 1, 1900..	300	00
Nigger Island.....	Carson Jeffrey	" 28, 1894..	200	00
Niagara on the Lake.....	Fred Masters.....	Nov. 12, 1901..	400	00
" " Range.....	Robert Allen	July 19, 1907..	150	00
North Sister Rock.....	John Thibault.....	Dec. 6, 1905..	350	00
Nottawasaga Island.....	J. F. Burmister.....	May 2, 1904..	500	00
Oakville Pier.....	Maurice Felan.....	April 28, 1894..	150	00
Oka.....	H. Lacroix	Nov. 10, 1898..	130	00
Owen Sound.....	Archibald McLean.....	Dec. 23, 1897..	150	00
Otter Head.....	Robert McMenemy.....	Nov. 17, 1903..	400	00
Papineauville.....	Joseph Chabot.....	June 17, 1897..	125	00
Pelee Island.....	J. R. Lidwell.....	July 10, 1899..	300	00
Peninsula Harbour.....	D. B. Hawkins.....	Aug. 31, 1891..	500	00
Pie Island.....	James Forbes.....	April 1, 1908..	300	00
Pigeon Island.....	J. H. Davis.....	May 16, 1896..	350	00
Point à Cadieux.....	Simeon Poirier.....	" 4, 1904..	150	00
Point au Baril.....	Ole Hanson.....	July 10, 1907..	300	00
Pelee Passage.....	W. A. Manson.....	Nov. 11, 1902..	650	00
"	F. F. Goulin	Aug. 2, 1904..	500	00
"	Louis Langlois	Feb. 25, 1904..	500	00
Point Aux Angles	Lucas H. Masson.....	Sept. 4, 1897..	200	00
Point Aux Pins.....	Alexander McKinnon.....	May 16, 1904..	400	00
Point Claire.....	Benj. Gloude.....	Aug. 1, 1907..	100	00
Point Clark	M. McDonald.....	Jan. 8, 1897..	400	00
Point Edward	Louis Knauff.....	May 23, 1908..	150	00
Point Peter.....	G. J. Scott	June 6, 1901..	650	00

*Salary paid for keeping Lancaster Pier and Lancaster Bar.

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Lightkeepers, &c.—Continued.

ABOVE MONTREAL—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Point Pleasant	Frank Connors.....	Oct. 13, 1898..	300 00
Point Porphyry.....	Andrew Dick.....	Aug. 10, 1880..	450 00
Port Arthur.....	Albert Bisonette	April 28, 1908..	240 00
Port Burwell.....	John Sutherland.....	June 18, 1894..	400 00
Port Colborne.....	D. H. A. Fortier.....	April 11, 1865..	550 00
Port Colborne Fog-Alarm.....	Hugh Clarke, jr	May 30, 1904..	600 00
Port Credit	John Miller.....	Dec. 16, 1897..	150 00
Port Dalhousie.....	Bernard McGrath.....	Oct. 2, 1907..	300 00
" " Fog-Alarm.....	Bernard McGrath.....		
Port Elgin.....	R. M. Lowry.....	Mar. 14, 1896..	80 00
Port Dover.....	Silas L. Butler.....	July 15, 1897..	300 00
Port Maitland.....	Mrs. James Grant.....	June 29, 1907..	350 00
Port Stanley.....	John Oliver.....	Dec. 16, 1907..	280 00
Presqu' Isle.....	Hugh H. McKenzie.....	May 7, 1907..	200 00
Presqu' Isle Main	Hugh E. Smith.....	April 29, 1898..	350 00
" " Fog-Alarm	W. B. Ainsworth.....	Oct. 12, 1907..	600 00
Providence Bay	John B. Sinclair.....	Mar. 6, 1906..	300 00
Rainy River.....	Patrick O'Connor.....	June 23, 1904..	250 00
* Red Rock	(see Snug Harbour)		
Red River Range.....	William Hughes.....	Feb. 12, 1892..	350 00
River Thames.....	H. J. Cartier.....	Oct. 19, 1884..	425 00
Rondeau.....	W. R. Fellows.....	Dec. 18, 1888..	350 00
Rosseau.....	J. G. Dixon.....	July 21, 1890..	100 00
Salmon Point.....	Amos McDonald.....	" 12, 1897..	300 00
Saugeen.....	D. McAulay	Mar. 16, 1899..	120 00
Scotch Bonnet.....	Cyrus R. Spencer.....	April 7, 1903..	350 00
Silver Islet.....	Capt. Jas. Cross.....	May 18, 1905..	100 00
Shoal Point.....	E. E. Rains.....	Nov. 24, 1884..	250 00
Slate Island	Alex. B. Sutherland.....	July 21, 1908..	450 00
Snake Island.....	John Whitmarsh.....	" 18, 1900..	350 00
* Snug Harbour	Adam Brown.....	April 11, 1900..	
Southampton (Saugeen).....	James Brown.....	June 29, 1904..	150 00
South Bay Point.....	Marcellus Vorce.....	Nov. 21, 1902..	200 00
" " Range.....	John A. Ritchie.....	Sept. 10, 1903..	150 00
South River.....	Frederick Beacher.....	July 2, 1903..	80 00
South East Bay.....	Thomas Darling.....	Jan. 31, 1891..	60 00
Spanish River or Boyd Island.....	Mrs. Elizabeth Martin.....	" 6, 1905..	250 00
Ste. Anne de Bellevue.....	Jos. L. Stocker.....	May 20, 1902..	150 00
" " Locks.....	F. X. Demers.....	" 17, 1907..	75 00
St. Anicet Bar.....	Donald McKillop.....	June 8, 1892..	230 00
Ste. Placide.....	Joseph Lafleur.....	May 25, 1907..	140 00
Sqaw Island.....	Neil McDougall.....	April 25, 1901..	200 00
Stag Island.....	Thos. M. Cowan	Nov. 3, 1903..	150 00
Stokes Bay.....	Alex. Smith	May 14, 1908..	180 00
Stripling Point.....	David Humes.....	Aug. 27, 1902..	180 00
Strawberry Island.....	William McKenzie.....	May 4, 1893..	300 00
Sulphur Island.....	J. J. King.....	" 15, 1905..	300 00
Thessalon.....	James Harvey.....	Nov. 28, 1897..	300 00
Tomahawk Island.....	Thomas Sweeney.....	Sept. 19, 1902..	200 00
Thornbury.....	Robert Lowe.....	April 12, 1887..	80 00
Telegraph Island.....	George A. Rowe	Oct. 25, 1895..	200 00
Thunder Cape Fog alarm.....	William Craig.....	May 17, 1892..	700 00
Tobermory.....	Archibald Currie.....	Oct. 12, 1903..	250 00
Trenton Harbour.....	William Fitzpatrick.....	Jan. 27, 1906..	125 00
Toronto, East Gap.....	George McKelvie.....	June 13, 1905..	950 00
Victoria Island.....	George Cosgrove.....	Nov. 14, 1899..	350 00
" "	Catherine Rowen.....	June 3, 1903..	120 00
Way Shoal.....	Chas. A. Mongeon.....	May 23, 1887..	100 00
Weller's Bay.....	H. J. Chase.....	Nov. 4, 1898..	150 00
Western Island.....	Thos. J. Richardson.....	June 27, 1901..	800 00
Whiskey Island and Penetanguishene..	Christopher Columbus.....	Mar. 18, 1893..	400 00
Warton.....	William Gilbert.....	Sept. 13, 1907..	75 00
Wolf Island.....	William Gillespie.....	Mar. 16, 1885..	250 00
Wilson's Channel.....	H. G. Duncan.....	Aug. 25, 1905..	350 00

* \$2.00 per day for this and Snug Harbour. Light.

STATEMENT giving Names of Stations and Lightkeepers, &c.—Continued.
ABOVE MONTREAL—Concluded.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Welcome Island.....	Adolph Perras	May 10, 1906..	350 00
Way Shoal Channel.....	Moise Beauchamp.....	Nov. 29, 1906..	150 00
Warren's Landing.....	Hugh McDonald	Aug. 25, 1905..	400 00
Wabbi River.....	A. M. Ross.....	Oct. 25, 1895..	600 00

BRITISH COLUMBIA.

Active Pass.....	H. Georgeson.....	July 21, 1884..	900 00
Amphitrite Point.....	G. W. Grant.....	April 2, 1906..	250 00
Berens Island.....	S. G. Harrison.....	Nov. 4, 1897..	300 00
Brockton Point.....	W. D. Jones.....	Aug. 20, 1890..	300 00
Brotchy Ledge	Thos. Sparks.....	Jan. 1, 1903..	120 00
Bare Point.....	J. Crozier.....	June 12, 1897..	168 00
Ballince Island.....	M. Brown.....	Oct. 3, 1901..	200 00
Birnie Island.....	C. Rudge	May 2, 1905..	240 00
Balfour.....	J. W. Gallup.....	Jan. 1, 1900..	120 00
Cape Beale.....	Thos. Patterson.....	Mar. 2, 1895..	1,200 00
Carmanah Point	W. P. Daikin	Nov. 4, 1890..	1,200 00
Cape Mudge	J. Davidson.....	June 27, 1898..	420 00
Coffin Island.....	R. Harrap....	April 15, 1903..	150 00
Crofton Light.....	R. Allan.....	May 31, 1907..	180 00
Discovery Island.....	M. A. Croft.....	April 1, 1902..	900 00
Dryad Point.....	C. Carpenter.....	Nov. 7, 1899..	300 00
Dock Island.....	Hugh Moore.....	May 15, 1903..	240 00
Danger Reef.....	R. Harrap.....	April 15, 1903..	150 00
Denman Island.....	J. A. McMillan.....	Aug. 15, 1906..	400 00
Entrance Island.	M. G. Clark.....	Nov. 26, 1897..	1,200 00
Egg Island.....	J. W. Davies.....	May 2, 1905..	1,200 00
Estevan Point.....	A. Luckovich.....	April 1907..	*75 00
Fisgard.....	Capt. Geo. Johnston.....	July 20, 1901 ..	500 00
Fiddle Reef.....	D. H. McNeill.....	Mar. 21, 1905..	400 00
Fraser River Lights.....	A. A. Parker.....	July 1, 1907..	300 00
Garry Point	A. A. Parker.....	" 1, 1907..	120 00
Gallows Point.....	Western Fuel Co.....	May 1906..	120 00
Green Island	S. Baker.....	June 21, 1907..	1,100 00
Ivory Island	F. Reuter.....	May 2, 1905 ..	500 00
Joan Point.....	R. Harrap.....	April 15, 1903..	180 00
Kaslo Spit.....	Kootenay Electric Co.....	Dec. 1, 1897..	240 00
Kyuquot Light.....	A. Ellis	Jan. 21, 1906..	240 00
Lawyer Island.....	F. W. B. Elsterman.....	April 1, 1905..	600 00
Lennard Island.....	R. Pollock.....	July 1, 1908..	**1,200 00
Lendad Island.....	F. C. Gerrard.....	*Mar. 31, 1905..	800 00
Lucy Island.....	Amos Hanson.....	May 12, 1908..	510 00
Lund Light.....	Gas Beacon, (No keeper).....		
Merry Island.....	W. T. Franklin.....	Jan. 8, 1904 ..	360 00
North Arm Lights.....	J. F. McMillan	Mar. 29, 1905..	240 00
Nanaimo Harbour	H. B. Shaw.....	June 12, 1907..	200 00
Point Atkinson.....	W. Erwin.....	Oct. 5, 1880..	1,300 00
Portlock Point.....	W. J. Gillespie.....	Nov. 1905..	460 00
Prospect Point.....	Jno. Grove.....	July 7, 1898..	300 00
Pointer Island.....	Jas. Codville.....	Dec. 26, 1899..	360 00
Portier Pass.....	F. Allison.....	Nov. 15, 1902..	500 00
Proctor.....	G. W. Gallup.....	Jan. 1, 1900..	240 00
Pilot Bay	E. Montreuil.....	Oct. 17, 1907..	560 00
Pine Island.....	A. B. Gurney.....	April 1, 1907..	700 00
Pine Island.....	T. C. Hayllar.....	" 31, 1908..	500 00
Pine Island.....	W. Hunt.....	May 1, 1908..	500 00
Pultney Point.....	E. Hukkla (Temporary).....	Feby. 1, 1907..	500 00
Pachena Point.....	J. Richardson.....	Sept. 1, 1907..	700 00
Pachena Point.....	W. R. Pillar.....	" 5, 1907..	800 00

* \$75.00 per month—temporary keeper. ** Must provide assistant

SESSIONAL PAPER No. 21

STATEMENT giving Names and Stations of Lightkeepers, &c.—*Concluded.*
BRITISH COLUMBIA—*Concluded.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Quatsino Light.....	G. H. Jackson.....	Jan. 29, 1907..	300 00
Race Rocks	F. Eastwood.....	" 21, 1891..	1,200 00
Saturna Island.....	Jas. Georgeson.....	Oct. 26, 1889..	550 00
Sand Head's Lt. Ship.....	M. O'Brien.....	" 1, 1904..	1,200 00
Sisters.....	B. Blanchard.....	Feb. 20, 1905..	600 00
Sechelt.....	Gas Beacon, (No keeper).....		
Scarlet Point	T. Nelson.....	Mar. 6, 1906..	450 00
Sechart Light....	G. Strickland.....	" 27, 1908..	180 00
Sooke Light.....	A. Codtel.....	April 15, 1907..	120 00
Trial Island.....	H. S. O'Kell.....	Aug. 20, 1906..	600 00
Trial Island	J. McDonald.....		450 00
Victoria Harbour.....	Thos. Sparks.....	Jan. 29, 1903..	180 00
Walker Rock.....	John Georgeson.....	Feb. 8, 1900..	240 00
Yellow Island....	John Doney.....	May 1, 1905..	500 00

** By Order-in-Council, 17th June, 1908, H. S. O'Kell is to receive \$1,200.00 per annum and must furnish all necessary assistance and pay for same.

APPENDIX No. 13.

MARINE SCHOOLS.

G. J. DESBARATS, Esq.,
Acting Deputy Minister of Marine and Fisheries,
Ottawa, Ont.

SIR,—I have the honour to herewith submit a statement of the attendance at the lectures on marine subjects which were given at the following places:—Yarmouth, Lunenburg, North Sydney, Quebec, Toronto, Collingwood, Vancouver and Victoria.

The method of tuition at these schools has not been altered from that which was followed the previous year, as it is thought to cover all the necessary subjects upon which our seamen are expected to be conversant with.

The lectures are of two hours duration, which is deemed long enough not to weary the attention of the attending students, and were given every Tuesday and Friday during the months of January, February and March.

Heretofore, the above days and months have been accepted uniformly in all schools, but it has been found, whereas the month of January has been a proper time to begin the lectures in some localities, that it did not answer in others, owing to the fact of the navigation closing earlier in some vicinities than in others, and for the future, this uniformity will not be followed as regards the month and day in order to suit the requirements of localities where the lectures are delivered.

Subjects relating to the rule of the road, and the errors of the compass, have engrossed the attention of the lecturers and therefore more time has been devoted to those two subjects than to any of the others.

Though in some localities, the attendance has been rather discouraging, still on the whole, I think the efforts of the government to increase the efficiency of our seamen, have been duly appreciated.

No lectures were given in Halifax, St. John and Kingston, owing to the fact that examiners were not appointed for these three places.

The college authorities at Canso have, last winter, made an attempt to teach the rudiments of navigation, which proved so satisfactory that it is the intention for this coming winter to have a series of lectures delivered at that place on the same basis as followed in other schools and under control of this department.

For the purpose of those lectures, all the offices have been fully equipped with all necessary instruments for practical demonstration. These schools have been provided with a reflectoscope, by the help of which diagrams, plans and engravings can be thrown on the screen in a most effective and interesting way. This instrument has proved a great help to the lecturers to aid them in developing subjects under discussion.

I herewith attach a statement of the maximum, minimum, average and total of the attendance at all the schools last winter.

I have the honour to be, sir,

Your obedient servant,

(Sgd.) L. A. DEMERS,
Chief Examiner.

SESSIONAL PAPER No. 21

STATEMENT.

Name of Ex.		No. lect.	Min.	Max.	Average.	Total.
Victoria.....	Capt. Jones.....	32	10	17	14	455
Vancouver.....	Capt. Eddie.....	32	11	53	20.9	669
Lunenburg.....	Capt. Wolff.....	32	1	14	4	119
Collingwood.....	Capt. Coles.....	30	9	50	22	668
Toronto.....	Capt. Moller.....	30	2	30	16	492
Quebec.....	Mr. Seaton.....	30	2	17	9	293
North Sydney.....	Capt. Sutherland.....	28	1	12	6	176
Yarmouth.....	Capt. Murphy.....	32	4	15	8	256
Total attendance.....						3,135

APPENDIX

LIFE Saving Stations maintained

Number.	Stations.	Established	Coxswain.	Crew.	Coxswain's Salary. Per annum.	Pay of Crew.
	<i>Bay of Fundy—</i>				\$	
1	Seal Cove.....	1898	F. Benson ..	7	75	\$2 per drill, and extra when engaged saving life.
2	Yarmouth... ..	1886	A. Cain	7	75	" "
3	Mud Island.. ..	1887	I. Pitman		80	.....
4	Seal Island.....	1880	H. Hitchens....	7	250	\$100 each of crew per annum...
	<i>Atlantic Coast—</i>					
5	Clark's Harbour .. .	1900	Thomas N. Nickerson.	7	75	\$2 per drill, and extra when saving life.
6	Blanche	1889	W. A. B. Smith.	7	75	" " ..
7	Port Mouton.....	1889	Walter Cook....	7	75	" " ..
8	Duncan's Cove.....	1886	J. W. Holland..	7	75	" " ..
9	Herring Cove....	1885	J. Gorman.....	7	75	" " ..
10	Devil's Island.....	1885	Benj. H. Henneberry.	7	75	\$2 per drill, and extra when saving life.
11	White Head.....	1890	H. P. Munroe ..	6	75	" " ..
12	Sable Island .. .	1885	{ G. Soderberg... J. Ritcey.....	..... .....	250 } 250 }	Paid as island staff.....
13	Scatterie Island.....	1885	F. Martell....	7	75	\$2 per drill, and extra when saving life.
	<i>Gulf of St. Lawrence—</i>					
14	St. Paul's Island...	1885	Supt. Humane Establishment.	3	...	\$300 each per annum.
15	Pictou Island.....	1889	Alex. Currie....	7	75	\$2 per drill, and extra when saving life.
	Cape Tormentine .. .	1893	No organized crew.			.....
16	Charlottetown ...	1907	J. P. Moore ..	7	75	\$2 per drill, and extra when saving life.
17	Souris, P.E.I	1907	Wm. Macdonald	7	75	" " ..
18	Alberton, P.E.I	1907	Jno. Champion..	7	75	" " ..
19	Escuminac	1907	Ernest Flieger..	7	75	" " ..
	<i>Great Lakes—</i>					
20	Wellington...	1883	No organized crew.			" " ..
21	Consecon	1898	W. A. Young...	7	75	" " ..
22	Cobourg.....	1882	D. Rooney.....	7	75	" " ..
23	Port Hope.....	1889	W. T. Clarke...	7	75	" " ..
24	Toronto Island.	1883	Wm. Ward.....	7	75	" " ..
25	Long Point.....	1902	Geo. Wisner....	7	+75	\$2 per drill, and \$40 per month for three months.

SESSIONAL PAPER No. 21

No. 14.
by the Dominion Government.

Description of Boat.	Cost.	Where Built.	Equipment.	Remarks.
	8			
Beebe-McLellan surf-boat, self-bailing, 25 feet long.	250	Shelburne, N.S.	Full regulation.	Iron rails laid in 1900.
Dobbin's pattern, self-bailing and self-righting, 25 feet long.	575	Dartmouth, N.S.	"	"
Fishing-boats and dories.....	80 pr. an	.....	Ordinary.....	Kept by contract with fishermen.
Beebe-McLellan boat on east side.	240	Shelburne and	Full regulation.	New boat, 1903.
west side		Halifax, N.S.		
Beebe-McLellan, self-bailing, 25 feet long, low ends.	250	"	"	Boat house and gear cost \$700.
Beebe-McLellan surf-boat, self-bailing, 25 feet long.	250	Dartmouth, N.S.	"	New boat in 1901.
Dobbin's pattern, self-righting and bailing, 25 feet long.	575	"	"	
Beebe-McLellan surf-boat, self-bailing, 25 feet long.	250	Shelburne, N.S.	"	Lyle gun established here in 1900; new boat, 1903.
"	250	"	"	
Dobbin's pattern	575	Dartmouth, N.S.	"	Lyle gun.
"	
Two Dobbin's self-righting and bailing boats and one Beebe-McLellan surf boat, self-bailing.	1,100	Halifax, N.S....	"	Lyle gun and rocket apparatus kept here. Coxswains are under the control of Supt. of Humane Establishment.
Beebe-McLellan surf-boat, self-bailing, 25 feet long,	250	Shelburne, N.S.	"	New boat, 1903.
Beebe-McLellan self-bailing, 25 feet long, low ends.	250	"	Full equipment..	Lyle gun added in 1900
Dobbin's pattern, self-righting and bailing, 25 feet long.	575	Dartmouth, N.S.	"	
Boats of winter mail service . . .	.....	.....	Ordinary	
Beebe-McLellan self-bailing	225	Shelburne, N.S.	Full equipment..	
Beebe-McLellan	225	"	"	
.....	225	"	"	
.....	225	"	"	
Dobbin's pattern, self-righting and bailing.	750	Buffalo, N. Y....	"	Removed from Poplar Point in 1900.
"	750	"	"	Removed from Wellington in 1893.
"	575	Goderich, Ont..	"	
"	620	"	"	
"	600	"	"	New boat, 1895.
Surf-boat.....	500	Collingwood . . .	"	New station and new boat 1902. Boat sent to Southampton, 1907. Replaced by a new boat.

APPENDIX No. 14—LIFE Saving Stations maintained.

Number.	Stations.	Established.	Coxswain.	Crew.	Coxswain's Salary. Per annum.	Pay of Crew.
26	Port Stanley.....	1885	Wm. Berry.....	7	75	\$2 per drill, and extra when saving life.
27	Point Pelee.....	1900	W. A. Grubb, jr.	7	75	
28	Goderich.....	1886	J. R. Craigie....	7	75	
29	Collingwood.....	1885	P. Doherty.....	7	75	" " "
30	Kincardine.....	1903	Thos. McGaw..	7	75	" " "
31	Southampton..	1907		7	75	" " "
<i>British Columbia—</i>						
	Banfield, B.C.....	1907	Cpt. W.H. Gillen and 4 permanent.			\$75 for coxswain, \$50 for engi- neer, \$45 for 2 men per month.
	Victoria, B.C.	1907	Boat in charge of Vic. Life Saving Association.			Maintained by association.....
	Clayoquot, B.C.	1908	Jno. Chesterman	7	75	\$60 per month till April 1. Volunteers, 50c. per hour.
	Clo-oose, B.C.....	1908	D. Logan. Not organized.		60 perm.	\$45 per month for three months.
	Ucluelet, B.C.	1908	A. H. Lyche....		75 perm.	\$60 per month for men during the season.

SESSIONAL PAPER No. 21

by the Dominion Government—*Concluded.*

Description of Boat.	Cost.	Where Built.	Equipment.	Remarks.
	\$			
Beebe-McLellan surf-boat, self-bailing, 25 feet long.	350	Collingwood . . .	Full equipment..	
Surf-boat.....	330	"	"	.. Boat house removed from Point up 200 yards and tramway built.
"	330	"	"	.. New boat, 1902.
Beebe-McLellan self-bailing surf-boat.	375	"	"	.. New boat, 1896.
"	350	"	"	.. New boat, 1903.
"	330	"	"	.. Sent from Long Point in 1907.
Self-righting, self-bailing power lifeboat, 36 feet.	10,900	Bayonne City, N.J., U.S.A.	"	..
Doherty's Improved Beebe-McLellan boat, 25 ft. 4 in.	575	Vancouver Shipyard Co., Ltd., Vanc'ver, B.C.	"	..
"	575	Vancouver Shipyard Co., Ltd.	"	..
"	575	"	"	..
"	575	"	"	..

APPENDIX No. 15.

HYDROGRAPHIC SURVEY.

OTTAWA, November 24, 1908.

The Deputy Minister, Marine Department,
Ottawa, Ont.

SIR,—I have the honour to offer the following supplement to my report of the 19th October, 1907, upon the progress of the Hydrographic Survey during the fiscal year 1907-1908.

During the season of 1907 there were four parties engaged in the field, viz.: one on the Great Lakes, one on the Lower St. Lawrence river, one on the Pacific coast, and one on Lake of Two Mountains.

Great Lakes.—The work of this party was confined for the most part to a survey of the coasts of the islands and channels leading from Lake Superior to Nipigon bay. The examination of Nipigon strait, Moffat channel and the south shores of Ile St. Ignace and Simpson island was completed and the work plotted upon a scale of one and a half inches to the nautical mile. No outlying dangers were discovered. The steamer laid up for the season at Owen Sound, Ont., on the 8th of November and on the 13th of March, 1908, Captain Zealand resigned his position as sailing master. No other changes were made in the staff.

Survey of the Lower St. Lawrence.—As stated in my preliminary report of the 19th October, this party, under Lieut. Miles, R.N., was engaged during the whole season upon the River St. Lawrence between Hare island and Tadousac. A very careful examination of the reef at the north end of Hare island, that about White island and that at the south end of Green island was made. Their extent has been ascertained and defined upon a scale of two inches to the nautical mile.

In addition a re-survey of the mouth of the Saguenay river on a scale of three inches to the nautical mile was started but had to be left for the season of 1908 for completion. At the close of the survey the sailing master, Captain Belanger, and chief engineer, J. Boisvert, resigned their position.

Pacific Coast.—This party is in charge of Captain P. C. Musgrave, and performed its work from a camp using gasoline launches and gigs for conveyance. All the southern approach to Prince Rupert harbour was surveyed, as well as the northern and middle approaches to the Skeena river. The information gathered has been of very great value to vessels trading in that neighbourhood as the old surveys were particularly inaccurate.

Lake of Two Mountains.—This party is under Mr. A. J. Pinet and made good progress in the survey of the main portion of the lake, but none of it was sufficiently advanced to publish.

Plans prepared.—All the parties, except that upon the Pacific coast, spent their time in office at Ottawa and all were engaged in preparing work for engraving and publication.

Charts issued.—On Lake Superior charts Nos. 101 and 102, embracing the north shore between Pigeon river and Lamb island, were issued in February, and a blue print of Key harbour, Georgian bay, was given out as a preliminary to assist those vessels that expected to trade into the harbour this season.

SESSIONAL PAPER No. 21

On the St. Lawrence river, photolithograph charts Nos. 1 and 16, being those of Montreal harbour and the stretch of river between Ste. Emelie and Deschambault, were issued to the public.

Pacific coast.—Black and white prints were issued to the public, of the southern entrance to Prince Rupert harbour and the Middle Passage to the Skeena river. These were preliminary to the regular charts, which take a long time to engrave.

In the engraver's hands on the 1st of March were the following charts:—Lower St. Lawrence, 'White island to Orignaux Point,' St. Lawrence between Quebec and Montreal, chart of Lake St. Peter and charts Nos. 17 and 18. Upper St. Lawrence, chart of Lake St. Louis.

The following are the results of the magnetic observations mentioned in my preliminary report:—

Place.	Latitude.	Longitude.	Chart.	Date.	Observed Declination.
1907.					
Moss Island	48-39-35 N.	88-22-15 W.	Admiralty, No. 322...	June 25..	6-57.3 E.
Owl Island.....	48-43-05 N.	88-12-30 W.	"	" 26..	6-52.4 E.
Cedar Island.....	48-38-00 N.	88-20-00 W.	"	" 27..	3-40.0 E.
Smooth Island.....	48-45-55 N.	87-58-40 W.	"	" 28..	3-34.4 E.
Rosspoint.....	48-50-30 N.	87-44-10 W.	"	July 4..	1-07.3 W.
"	"	"	"	" 5..	2-58.0 E.
"	"	"	"	" 6..	3-03.6 E.
"	"	"	"	" 7..	0-16.0 E.
"	"	"	"	" 8..	0-27.4 E.
"	"	"	"	" 9..	0-16.5 E.
Trois Pistoles.....	48-07-42 N.	69-10-51 W.	Admiralty, No. 312.....	Aug. 3..	21-27.0 W.
"	"	"	"	" 4..	21-24.3 W.
"	"	"	"	" 5..	21-29.8 W.
Ile Verte.....	48-00-42 N.	69-19-07 W.	"	" 6..	21-03.2 W.
Rivière du Loup.....	47-51-33 N.	69-33-12 W.	Admiralty, No. 313.....	" 7..	21-01.6 W.
"	"	"	"	" 9..	20-46.5 W.
Tadoussac.....	48-08-45 N.	69-42-48 W.	"	" 10..	20-46.5 W.
"	"	"	"	" 13..	20-04.2 W.
"	"	"	"	" 14..	20-05.5 W.
"	"	"	"	" 15..	20-06.9 W.
Châteauguay Pt.	45-24-11 N.	73-45-22 W.	Canadian, H.S.	31..	14-23.3 W.
Ste. Anne.....	45-24-00 N.	73-56-49 W.	"	Sept. 2..	14-23.8 W.
"	"	"	"	" 4..	12-45.5 W.
"	"	"	"	" 5..	12-48.3 W.
"	"	"	"	" 6..	12-47.1 W.
Melocheville	45-19-12 N.	73-55-44.5 W.	"	" 11..	12-43.0 W.
"	"	"	"	" 12..	12-47.0 W.
"	"	"	"	" 13..	12-41.0 W.
Cedars.	45-17-56 N.	74-02-36 W.	U.S.H.O., No. 1,351	Oct. 3..	14-43.8 W.
"	"	"	"	" 4..	14-43.8 W.
Côteau Landing.....	45-15-24 N.	74-12-32 W.	"	Sept. 25..	12-25.7 W.
"	"	"	"	" 26..	12-24.1 W.
"	"	"	"	" 27..	12-22.4 W.
"	"	"	"	" 28..	12-21.5 W.
South Lancaster.....	45-07-55 N.	74-24-39 W.	Admiralty, No. 2,789 C....	Oct. 8..	11-54.2 W.
"	"	"	"	" 9..	11-54.4 W.
Cornwall.....	45-01-11 N.	74-41-49 W.	R. St. L., No. 1, U.S.A....	" 11..	11-51.8 W.
"	"	"	"	" 12..	11-52.2 W.
"	"	"	"	" 13..	12-01.8 W.

The observations at Cornwall were taken on the first two days when the street cars were running and on the third day (Sunday) when no cars were on. The electrical current seems therefore to increase the declination by about ten minutes.

All of these observations were taken by Mr. Arthur Amos of this staff.

8-9 EDWARD VII., A. 1909

The amounts expended on the various branches were:—

Great Lakes	\$20,759 97
Atlantic coast or Lower St. Lawrence	29,294 30
Pacific coast	29,960 70
St. Lawrence	7,204 42
Lake of Two Mountains	11,122 27
Lake St. Francis	2,451 70
Office	14,837 95
	<hr/>
	\$115,631 31

I am, sir,
Your obedient servant,
WM. J. STEWART,
Hydrographer.

APPENDIX No. 16.

SOREL GOVERNMENT SHIPYARD.

Lt.-Col. F. GOURDEAU,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to report on the work done at the Sorel shipyard during the twelve months ended March 31, 1908.

NEW CONSTRUCTIONS.

New Tug.—Plans and patterns were perfected for one tug for the construction of lights on the upper lakes. Material was bought, drawings were completed and building commenced. At the end of the fiscal year, the hull of this vessel was in an advanced state, the boiler for same, built at Sorel, was nearing completion.

Dipper Dredge for Cap à la Roche.—This is intended to be a powerful machine, capable of excavating the solid shale rock met at Cap à la Roche. The steel plates and other material were ordered, working drawings prepared and detailed, and the building commenced. At the end of the fiscal year, the hull had been almost completed, the boiler was completed and put in place, the large forward spuds were put together, ready for riveting.

Floating workshop.—A scow was built to receive a forge and machine shop. This is intended to follow the dredging fleet and to be available for pressing repairs of minor importance.

The hull and house were completed during the winter season. The scow is 90 feet by 25 feet.

Lodging scows.—Two lodging scows were also built to serve as sleeping quarters for the crews of tugs and spare men on dredges. These scows are 60 feet by 18 feet by 8 feet.

Second Dipper Dredge.—Besides the above, some preliminary work was done on a dipper dredge to be a duplicate of construction No. 19.

Repair work on Ship Channel Fleet.—The whole of the plant of the dredging fleet was fitted and supplied in the spring and maintained in good order during the season of work. At the end of November and beginning of December, the fleet was put in winter quarters at Sorel and repairs to machinery were commenced in the shops. Repairs to hulls were begun in February and continued through March, 1908.

The principal items of repairs were the following:—

Dredge No. 1, was hauled on the slipway. The sides of her well were repaired, several planks were renewed, the seams all caulked and tarred. The rest of the hull was also caulked, the seams tarred and woodwork painted.

The four pistons of the main engine were ground, joints in the steam distribution were overhauled as well as the boiler.

Dredge No. 2. There was a lengthening of the side chute, to reach further on the scow. Also two iron troughs added for the chains forward. A new upper tumbler was placed.

8-9 EDWARD VII., A. 1909

Dredge No. 4. A new lining of the chute was provided, the chute being first strengthened.

Dredge No. 6—had repairs to her boilers, to the plates of the side chute. Two new smoke stacks for boilers.

Dredge No. 7.—The intermediate and low pressure pistons were ground. A new lining inside of the suction turbine was put in, and a new shaft for wheel of this pump was fitted and put in place. Repairs were made to the four boilers.

Fifteen of the discharged pipe pontoons were hauled for caulking and painting.

Dredge No. 8.—Alteration was made to bow anchor winch, to have quicker motion when winding up chain.

Dredge No. 9. Alterations and repairs to the suction pipe travelling crane.

Tug Cartier—had extensive repairs to her deck and upper part of hull.

The boiler was repaired and a new smoke stack and smoke stack casing were put on.

Tug Champlain. A steering gear from the *Jas. Howden* was installed.

Tug Jas. Howden. The deck was caulked, a new steering gear was installed, more power being required for service below Quebec.

The upper part of the hull was tightened up and reinforced, a wooden chock placed under the guard so as to break the impact of the seas.

A new windlass was provided, and a new casing on smoke stack.

Str. De Levis. A new stern cabin was built.

Tug Jessie Hume. A pony pump was added to her equipment.

Coal barge No. 1—had a new smoke stack.

Coal Barge No. 2—had alterations and repairs made to her housing.

Coal Barge No. 3—had her deck overhauled and caulked.

The vessels employed on the maintenance of lights, viz.—the *Shamrock* and barge *Acetylene* were also attended to, as well as those of the construction of lights branch, viz.—the *Vercheres*, *Hosanna* and *Alpha*.

The Shamrock—had new fireproof floor laid of concrete and tubes under the fire-place.

There were repairs to the anchor hoisting winches. Valves and connections were overhauled, and the steam heating system improved.

The mast and boom were repaired, as also the winches.

Barge Acetylene. The mast was repaired and a new and longer boom installed.

Survey boat for Hydrographic Department. The *Str. La Canadienne* received a general overhauling. She was painted inside and out, the hull being first thoroughly scraped above water line. A condensing coil was added on her exhaust, so as to save the fresh water. A number of minor repairs were made.

Improvements to shipyard. During the summer of 1907 the following buildings were put up.

No. 18. Contains a paint shop and painting room, at one end, the other end has a store room for asbestos materials and work shop. The whole upper part of building No. 18 constitutes a mould loft 170 feet long by 35 ft. wide with good light on all sides, and heated in winter time. The working lines of the vessels are drawn full size in this loft.

SESSIONAL PAPER No. 21

No. 19.—Is a building to house the patterns of castings used for the dredging fleet and other constructions. This shed is 100 ft. long x 30 ft. wide and has three floors of these dimensions and an attic above.

Signal service. Cabins for four large and six small stations were built at the shipyard. Flag masts 60 feet in height were also made at the yard for twelve stations.

General. All the buildings of the shipyard were painted during the year and the machinery maintained in a good state of efficiency. The working force at the shipyard during the year varied from 610 to 744 and averaged for the year 641.

The financial statement herewith, shows the total amount expended at the Sorel shipyard during the fiscal year ending March 31, 1908, to have been \$1,049,859.41.

Yours obediently,

G. J. DESBARATS,
Director of shipyard.

GOVERNMENT SHIPYARD, SOREL.
STATEMENT of Revenue and Expenditure for the Fiscal Year 1907-1908.

Year.	Amount.	Year.	Amount.
	\$ cts.		\$ cts.
March 31.. To Appropriation for St. Lawrence ship channel.		March 31.. By Operating dredging fleet.	\$522,682 84
" 31 Appropriation for construction of sea-going hopper dredge.	759,556 84	" 31.. Construction for dredging fleet.	34,406 57
" 31.. Appropriation for construction of dredge for Cap à la Roche.	100,000 00	" 31.. Improvements to Sorel shipyard.	69,169 94
" 31.. Appropriation for construction of dredge for Cap à la Roche.	74,645 33	" 31.. Stores and materials.	31,290 09
" 31.. Steamer for construction of lights below Quebec.	12,260 26	" 31.. Construction No. 15 sea-going hopper dredge.	
" 31.. " " " on lakes.	49,626 87	" 31.. No. 19 dredge for Cap à la Roche.	
" 31.. Public Works Department.	1,142 47	" 31.. No. 21 steamer for construction of lights below Quebec.	
" 31.. Steamer <i>Maisonnette</i>	1,710 88	" 31.. No. 22 steamer for construction of lights on lakes.	
" 31.. Hydrographic Survey.	7,396 73	" 31.. Public Works Department, repairs and supplies.	49,626 87
" 31.. Construction of lights, P.Q.	21,348 28	" 31.. Steamer <i>Maisonnette</i>	1,463 95
" 31.. Maintenance of lights, P.Q.	9,140 14	" 31.. Hydrographic survey, repairs and supplies.	1,710 88
" 31.. " " B.C.	2,264 63	" 31.. Construction of lights, P.Q.	7,396 73
" 31.. Steamer <i>Scout</i>	183 13	" 31.. Construction of lights, P.Q.	21,348 28
" 31.. Signal service.	6,908 91	" 31.. Maintenance of lights, P.Q.	9,714 64
" 31.. Spur line.	87 02	" 31.. " British Columbia.	2,264 63
" 31.. Cruiser <i>Constance</i>	212 46	" 31.. Steamer <i>Scout</i>	225 88
" 31.. C.P.R. liner steamer <i>Montreal</i> , re salvage.	143 41	" 31.. Signal service.	6,973 41
" 31.. Steamer <i>Lady Grey</i> , trip to Seven Islands.	2,360 00	" 31.. Spur line, South Shore Railway.	87 02
" 31.. Sundry refunds.	872 05	" 31.. Cruiser <i>Constance</i>	212 46
		" 31.. C.P.R. liner steamer <i>Montreal</i> , re salvage.	143 41
		" 31.. Steamer <i>Lady Grey</i> , trip to Seven Islands.	5,495 14
		" 31.. Administration of pilotage steamer <i>Eureka</i>	16,342 37
		" 31.. Salaries at Ottawa.	5,431 98
		" 31.. Steamer <i>Rouville</i>	13,298 32
	1,049,859 41		1,049,859 41

SESSIONAL PAPER No. 21

APPENDIX No. 17.

INVESTIGATIONS INTO WRECKS AND CASUALTIES.

OTTAWA, April 1, 1908.

To the Deputy Minister, Marine and Fisheries,
Ottawa, Ont.

SIR,—I have the honour to submit my report on investigations into casualties and accidents that have occurred on the coasts of Canada, the Gulf and River St. Lawrence, and the Great Lakes, during the season of navigation of the last fiscal year.

The following casualties have been investigated:—

SS. *Mary*.
C.P.R. *Montrose*.
SS. *Lurline*.
SS. *Montreal*.
SS. *Montcalm*.
SS. *Mt. Temple*.
SS. *Yarmouth*.
SS. *Kildona*.
SS. *Basutoland*.
SS. *Lansdowne*.
SS. *Coban*.
SS. *Cassandra-John Lambert* (collision).
SS. *Martha-Eureka* (collision).
SS. *Senlac-Rosalind* (collision).
S.S. *Prescott-Havanna* (collision).
SS. *Prince George-Lowwood* (collision).
SS. *Imperial-Germaine* (collision).
SS. *Mongolian-Hurona*. (This investigation held in Great Britain.)
SS. *Charmer-Tartar* (collision).
SS. *Norwalk-Jett* (collision).
SS. *Jessie Hume-Corinne* (collision).
SS. *Vigilant-Nettie B.* (collision).

and the judgment of the court is attached.

In addition to the above-mentioned casualties there have been various investigations in regard to the disobedience of the orders which were laid down for the regulation of the traffic in the Lime-kiln crossing in the Detroit river.

The Lime-kiln crossing is a short and narrow passage, nearly opposite Amherstburg, in the Detroit river; it is entirely in Canadian waters, although nearly all the dredging improvements, &c., have been carried out by the United States government.

The traffic through this crossing is enormous, the records showing some twenty-five thousand vessels passing in the course of a season, carrying nearly seventy millions tons of freight. The whole breadth of the entire channel is only 450 feet, that is to say, 300 feet on the westerly side of the channel, with a depth of 21 feet; and 150 feet on the easterly side of the channel, with a depth of 19½ feet. It will, therefore, be seen that it requires the greatest possible care and caution to avert collisions in this narrow channel, which, if they did occur, very possibly would tie up the greater part of the tonnage of the great lakes; it was, therefore, necessary to establish a patrol, and, as the crossing is entirely in Canadian waters, it was decided that a Canadian patrol boat should be commissioned for this purpose; a set of rules and regulations were drawn

up for the regulation of traffic in this crossing; and the patrol tug is on duty, day and night, with most satisfactory results, seeing the regulations carried out.

The crossing at the Lime-kiln, being entirely in Canadian waters, it is the intention of the Canadian government to regulate the traffic in that locality, and the following regulations are to be carried out by the patrol boat, in addition to the regulations which have already been issued:—

1. All vessels bound down, to take westerly channel of the Lime-kiln crossing.
2. All vessels bound up, to take the easterly channel of the Lime-kiln crossing.
3. In cases of confusion it is the duty of the patrol boat to instruct vessels in the order in which they will pass the crossing, bound either up or down.

A report is sent every day to the department from the officer in charge of the patrol boat, reporting what vessels have passed up and down; their names and nationality, and, in the event of any master disobeying the regulations, if it is a United States vessel, the matter is reported to the United States authorities in Detroit, to take action in the case; and if a Canadian vessel, action is taken by this department.

The St. Lawrence route has been remarkably free from accidents during the season, and none of those which occurred involved loss of life; there were two collisions in the harbour of Montreal, the first between the *Prescott* and *Havanna*, and the second between the *Germaine* and *Imperial*; a third accident occurred when the SS. *Montrose* touched bottom in Lake St. Peter; there was also an investigation into a complaint against the United States steamer *John Lambert*, by the master of the SS. *Cassandra*, for the contravention of the rules of the road in Montreal harbour, and the captain of the *John Lambert* was fined. This was the first case of the kind which has happened in Canadian waters.

This session the Canada Shipping Act was amended in reference to investigations into shipping casualties in the following manner:—

(28) Section 782 of the said Act is repealed and the following is substituted therefor:—

‘782. A court so appointed is authorized to hold a formal investigation upon one being ordered by the minister in the following cases:—

- ‘(a) A shipping casualty.
- ‘(b) Where a master, mate, pilot or engineer has been charged with incompetency, misconduct or default while serving on board any British ship on or near the coasts of Canada or in the course of a voyage to a port in Canada.
- ‘(c) Where a master, mate, pilot or engineer is charged with incompetency, misconduct or default while serving as an officer on board a British ship registered in Canada.
- ‘(d) Where a master, mate, pilot or engineer is charged with incompetency, misconduct or default while serving on board a British ship found in Canada.
- ‘(e) Where, in a case of a collision, the master or certificated officer or pilot in charge of a vessel fails, without reasonable cause, to render to the other vessel, her master, crew and passengers, such assistance as is practicable and necessary to save them from any danger caused by the collision and to stay by the vessel until he has ascertained that she has no need of further assistance, and also to give to the master or persons in charge of the other vessel the name of his own vessel and of the port to which he belongs and also the names of the ports from which he comes and to which he is bound.
- ‘(f) Where the minister has reason to believe that any master, mate, pilot or engineer is from any cause unfit or incapable to discharge his duties.’

(29) The said Act is amended by inserting the following section immediately after section 782:—

SESSIONAL PAPER No. 21

‘782*a*. It shall not be necessary to hold a preliminary investigation before a formal investigation is held.’

(30) Section 784 of the said Act is repealed and the following is substituted therefor:—

‘784. A court holding a formal investigation into a shipping casualty shall hold it with two or more assessors to be selected for that purpose by the minister. Such assessors shall have nautical, engineering, or special skill in the matter to be inquired into, and the court shall be the sole judge as to whether any assessor possesses the requisite skill.’

(31) Section 75 of the said Act is repealed.

(32) Section 786 of the said Act is repealed and the following is substituted therefor:—

‘786. Every commissioner and assessor, before entering upon his duties, shall take and subscribe the following oath:—

‘I (A. B.) do swear (or solemnly affirm) that I will perform the duties of commissioner (or assessor) under the Canada Shipping Act, and that I will act faithfully in that capacity, without partiality, fear, favour or affection. So help me God.’

(33) Section 796 of the said Act is repealed and the following is substituted therefor:—

‘796. The court may at any time, either during or after a formal investigation, call upon any master, mate, pilot or engineer, to deliver his certificate to the court.’

(34) Section 798 of the said Act is repealed and the following is substituted therefor:—

‘798. The court shall, upon application being made therefor, furnish free of charge to any master, mate, pilot or engineer, whose certificate has been cancelled or suspended, or to his agent, a copy of the judgment of the court.’

(35) Section 799 of the said Act is repealed and the following is substituted therefor:—

‘799. The court shall in all cases send the judgment in the case, with the evidence, to the minister, and if it determines to cancel or suspend any certificate, and the certificate has been delivered to the court, the certificate shall also be sent to the minister.’

(36) Subsection 3 of section 801 of the said Act is repealed and the following subsection is substituted therefor:—

‘3. A certificate shall not be cancelled or suspended under this section unless the holder of the certificate has had an opportunity of making a defence.’

(37) Section 806 of the said Act is repealed and the following is substituted therefor:—

‘806. The minister may order the case to be re-heard by the court by which the case was heard in the first instance, or may appoint another commissioner and select the same or other assessors to re-hear the case.’

(38) The said Act is amended by inserting the following section immediately after section 806:—

‘806*a*. There shall be no appeal from any decision of a court holding any formal investigation under this Act, except to the minister, for a re-hearing under the provisions of section 806.

‘2. No proceeding or judgment of a court in or upon any formal investigation shall be quashed or set aside for any want of form, nor shall any such proceeding or judgment be removed by *certiorari* or otherwise into any court; and no writ of pro-

hibition shall issue to any court constituted under this Act in respect of any proceeding or judgment in or upon any formal investigation, nor shall such proceeding or judgment be subject to any review except by the minister as aforesaid.'

(39) Section 820 of the said Act is repealed and the following is substituted therefor:—

' 820. Every master, mate, pilot or engineer who fails to deliver his certificate to the court when so required, either during or after a formal investigation, shall incur a penalty not exceeding two hundred dollars.'

(40) The schedule of the said Act is amended by adding thereto the following forms:—

' FORM " W. "

' *Appointment of Commissioner.*

' In pursuance of the powers vested in me, I, the honourable... .., Minister of Marine and Fisheries of Canada, do hereby appoint... .. to be a commissioner for the purpose of holding a formal investigation into (here describe the casualty to be investigated).

' Dated at... .., this... .. day of... .., 19.. ..

' *Minister of Marine and Fisheries.*

' FORM " X. "

' *Appointment of Assessor.*

' Under the provisions of the Canada Shipping Act, I, the honourable... .., His Majesty's Minister of Marine and Fisheries of Canada, do hereby appoint... .. to be an assessor under the provisions of the said Act.

' Dated at... .., this... .. day of... .., 19.. ..

' *Minister of Marine and Fisheries.*

A full statement of wrecks and casualties that have occurred in Canadian waters and to Canadian sea-going vessels in others waters, will be found in the supplement to this report.

I have the honour to be, sir,
Your obedient servant,

O. G. V. SPAIN,
Wreck Commissioner for Canada.

SS. ' MARY. '

The court, after reviewing the evidence adduced, finds as follows:—

That the steamer *Mary* was managed by Messrs. Revillon Bros., and in the fall of 1906, the vessel being out of commission and without master or ship's company, Messrs. Revillon gave instructions to Mr. Fournier, who had been formerly master of the *Mary* for a short period, and who holds a certificate as master of a fore-and-aft rigged sailing vessel, to place her in winter quarters, and that this officer not having great experience of the movement of the water and ice during the winter season in the

SESSIONAL PAPER No. 21

harbour of Montreal, took counsel with a Mr. Rochon as to the desirability of placing the vessel alongside the Tarte pier for the winter; this man, considering that the Tarte pier was a safe place, advised Mr. Fournier to place the *Mary* there.

From all the evidence which it has been possible to gather, Mr. Rochon's knowledge of river conditions during the early spring were more general than particular. He had never before taken care of a steamer in the ice, nor had he at any time seen a steamer wintering in the ice in that locality.

The steamer *Mary* was placed alongside the Tarte pier and was frozen in there. She remained in that condition until the night of March 28, or the morning of the 29th, when the ice began to go down the channel and fill up the narrow parts, causing the water to back up over the ice.

The *Mary* being frozen in securely, and the ice by which she was held, holding firmly and failing to rise with the rising water, the water overflowed the vessel filling her and causing her to sink; the ice surrounding her slackening at the same time sufficiently to allow her to break through it.

The backing up of the water over the ice, caused by the loose ice, filling up the narrow parts of the channel, is a common happening and is a well known fact to persons of experience on the river; the effect of this backing of the water is much more noticeable below St. Mary's current, therefore, it is invariably customary to place vessels in winter quarters in Montreal harbour inside of the Guard or Mackay pier; the valuable plant belonging to Mr. Poupore, the contractor, was removed from the Tarte pier to a place inside the Mackay pier for winter quarters for the reason that the latter mentioned place was considered by the manager far safer in every way.

The court is of the opinion that the man whom Revillon Bros. left in charge of their vessel during the winter was not competent to fulfil the task, and the authorities of the port of Montreal were not consulted in reference to the berthing of the vessel. The regulations respecting berthing of vessels in the port of Montreal were not complied with in the case of the *Mary*.

In the opinion of the court a far safer place in the harbour of Montreal might easily have been found to winter her. Rochon being the only man employed was unable to take the customary precautions to prevent the vessel being damaged at the time of the well known spring conditions.

For the above mentioned reasons, the court is of the opinion that Messrs. Revillon showed a want of interest in the safeguarding of their vessel during the winter; there were many experienced men in Montreal from whom they could have taken advice, and who doubtless would have informed them that the Tarte pier was not a safe place to winter the vessel, but they were thoroughly satisfied with leaving the matter in the hands of Fournier and Rochon who, in the opinion of the court, were not competent men for this particular work.

There also apparently was no endeavour on the part of Rochon to cut away the ice round the vessel so as to give her a chance with the water, a custom which is generally followed.

The court is, therefore, of opinion that Messrs. Revillon Bros. are responsible for the damage caused to their vessel.

O. G. V. SPAIN,
Wreck Commissioner.

I concur:

JAMES RILEY,
Assessor.

SS. 'MONTROSE.'

The court, on the termination of hearing all the evidence which it was possible to obtain, and after affording both the pilot and the master and officers of the ship full opportunity for defence and explanation, finds as follows:—

The SS. *Montrose* is a vessel of 6,278 tons gross, and owned by the Canadian Pacific Railway Company, registered at the port of Liverpool, Great Britain, and commanded by Captain J. H. Moore, who holds a Board of Trade master's certificate.

The SS. *Montrose* was fully found in all the requisites to safe navigation, and properly manned, in accordance with the Act; from all the evidence adduced, all went well on the voyage until after the vessel passed Father Point, at which place, at 7.56 a.m. apparent time, on the 2nd instant, Branch Pilot Joseph H. Talbot, who holds a pilotage certificate for and below the harbour of Quebec, was taken on board, and took charge of the navigation of the vessel; at this time the weather was fairly clear, and the east end of Barnaby island was visible, but the weather conditions were such as to conduce to caution. At 9 a.m. Bicquette was passed at an approximately assumed distance of three miles, but nothing was observed; weather thick and lifting at intervals.

At 11.30 a.m. the vessel was enveloped in thick fog, but the sound signal on Red Island lightship was heard right ahead; ship was continued at full speed, which was in the neighbourhood of ten and one-half to eleven knots; for some reason, not satisfactorily explained to the court, they passed north of the Red Island lightship, star-boarding the helm, and passing between the ship and the island.

The testimony at this point is somewhat conflicting, it being impossible to find out exactly how long the ship was headed to the S.E., but the evidence of the master and officers of the vessel shows that the lightship was passed at 11.56 a.m., and the *Montrose* was steadied on her course of S.W. by W. $\frac{1}{4}$ W. at 12 h. 02 m. p.m. (or six minutes) and she took the ground at 12.18 p.m.; clearly proving that she could not have run on the S. E. course for as long a time, or for as great a distance, as the officers in charge assumed she had.

The court considers that the pilot, Joseph H. Talbot, was guilty of a grave error of judgment, inasmuch as he continued at full speed, and on too fine a course, without first ascertaining, by lead or otherwise, that the vessel was in a safe position to clear a thoroughly well known danger.

At the same time the court cannot exonerate the master, J. H. Moore, from blame, as this officer accepted the actions of the pilot as correct, and allowed him to alter the course, and continue at full speed, without first assuring himself of the actual position of the vessel—which might have been so easily and conveniently found out by taking the departure from the lightship, and running a course that would determine a safe offing from the Red Island reef. The court, taking into consideration the excellent record as a pilot held by Joseph H. Talbot, fines him the sum of one hundred dollars, which is to be paid in four quarterly instalments, of twenty-five dollars each; Captain J. H. Moore, master of the S.S. *Montrose*, is admonished and warned to be more careful in future. The court exonerates the other officers of the S.S. *Montrose*.

O. G. V. SPAIN,
Wreck Commissioner.

We concur:

ARCHIBALD REID,
Master Mariner and Port Warden of Montreal.

CHARLES A. RAYMOND,
Branch Pilot for and below Quebec.

S.S. 'LURLINE.'

The court having carefully inquired into all the circumstances attending the above mentioned shipping casualty, finds as follows:—

That the steamship *Lurline* was a vessel of 78 feet 8 inches long, 16 feet 3 inches beam, depth 7 feet 8 inches with a gross tonnage of 66 tons, that she was owned by

SESSIONAL PAPER No. 21

the Ontario Government and commanded by Captain J. B. Forest, who holds a service certificate as master of a steamer on the inland waters.

It appears from the evidence adduced that the *Lurline* left Sarnia, Ontario, on Thursday morning, October 26, 1907, and arrived off the port of Goderich about five o'clock in the evening of the same day, the whole run being made in daylight, and the obstruction which caused the casualty was also struck during daylight.

This obstruction was a breakwater which was built by the Federal Government several years ago and had been partly washed away and became submerged.

It was, however, marked by a stake at each end and, in addition to this, a gas buoy was at the southwest end. This buoy was red and was placed on the wrong side of the channel; the fact of the buoy being in this position, however, did not in any way affect this particular casualty, as by the evidence the captain himself gave he was proceeding in the harbour on the old ranges. These ranges have been in operation for more than 20 years, are misleading and lead a vessel immediately over the submerged breakwater. The court recommends that they should be immediately discontinued.

New range lights were put in operation in 1905, and on June 13 of that year mariners were all advised as to the work being done, on September 2, 1905, a further notice was sent out advising all mariners that new range lights had been established and at the same time giving explicit directions as to entering the harbour, again on September 20 of the same year mariners were advised that a portion of the breakwater had been carried away, and warning them to enter on the new ranges referred to above.

These notices to mariners are sent to all Canadian Collectors of Customs whenever any new aids to navigation are established or when any danger is reported, and masters of vessels should inquire at the customs house for these notices.

Captain Forest did not take the necessary precautions to possess himself of the latest information in regard to the harbour of Goderich, which could have been easily obtained from the last port the ship left, and the same information could also have been ascertained from the Coast Pilot Book, which was actually on board the steamer at the time of the disaster; this officer was under the very mistaken impression that the aids to navigation at the entrance to Goderich harbour were exactly the same as they were when he last was there, between 15 or 20 years ago, and the casualty to the *Lurline* was caused by the indifference and negligence of the master in not supplying himself with the necessary information in regard to the aids to navigation which have been established in recent years and which might have been so easily obtained.

As far as the court has been able to ascertain the previous record of Captain J. B. Forest is a good one, but the court is unable to overlook the carelessness of this officer in not providing himself with the information above mentioned, and therefore feels constrained (more especially as at the time of the accident the weather was clear and there was practically a calm sea) to suspend the service certificate as master of a steamer on the inland waters held by Captain Forest for a period of six months from the 25th day of October, 1907, the date of the disaster.

O. G. V. SPAIN,
Wreck Commissioner.

We concur:

(Sgd.) W. A. WIGGINS,
S. CRANGLE,

Master Mariners, Assessors.

8-9 EDWARD VII., A. 1909

S.S. 'MONTREAL.'

The court having carefully inquired into all the circumstances attending the above mentioned shipping casualty, finds as follows:—

That the steamship *Montreal* was fully found in all the necessary requisites to safe navigation, and properly manned, in every particular, in accordance with the Act; that the machinery and steering gear work well; and that the pilot's orders were promptly attended to.

It appears from the evidence adduced that all went well on the voyage, until after the vessel passed Quebec, where Branch Pilot Lyderic Bouille, (who holds a pilotage certificate for and above the harbour of Quebec), was taken on board and took charge of the navigation of the vessel; there was no trouble whatever experienced up to the time of passing the buoy, on the south side of the channel below lightship No. 2; the pilot himself steering and a strong wind blowing from the north. At this place the *Montreal* took a sudden sheer to starboard, (probably from the fact of having too much port helm at the time, although after passing the buoy the helm was put hard-a-starboard), and took the ground near lightship No. 2, striking her port bow against the crib and concrete base of the collapsed light-tower, thereby causing serious damage to the port side of the vessel, filling No. 1 hold and No 2 deep tank, with water, and damaging a large portion of cargo; the vessel remained stranded until 8 p.m. on the 3rd instant, when after lightening a good portion of the cargo, she floated and proceeded on her voyage to Montreal. The testimony, as to the working of the engines, and the orders given shortly before the accident occurred, is conflicting but the court considers that the evidence brought forth proves that the instructions of the pilot, in regard to the movements of the engines, were obeyed, and that he was responsible for any orders given. The court considers that the stranding of the steamship *Montreal* was caused by the wrongful act of Pilot Lyderic Bouille, and adjudges him guilty of a grave error of judgment in, (firstly) attempting to cross Lake St. Peter and not anchoring at the new anchorage ground, opposite white buoy No. 57, when he found the vessel was not (as he claims) steering well, and darkness was rapidly approaching; and, (secondly), although the channel is six hundred feet wide at this point, by attempting to pass north of lightship No. 2, which was evidently his intention, as—after the vessel had taken the ground, he gave the order 'full speed ahead' on both engines, and 'hard-a-port.' The court takes into consideration the long experience, eighteen and one half years, which Lyderic Bouille has had as a pilot; his uniform good conduct and freedom from accidents during this period; and, in view of these facts, desires to be as lenient as possible, under the circumstances, but cannot overlook the grave error in judgment that he made, on this occasion; and, therefore, imposes a fine of seventy-five dollars, to be paid in three quarterly instalments of twenty-five dollars each; the first instalment to be paid on January 1, 1908.

The court exonerates the master and officers of the steamship *Montreal* from all blame.

O. G. V. SPAIN,
Wreck Commissioner.

We concur:

(Sgd). ARCHIBALD REID,
.... Master Mariner and Port Warden of Montreal, Assessor.
WILBROD GAUTHIER,
Branch Pilot for and above the Harbour of Quebec, Assessor.

JUDGMENT *re* STRANDING OF THE C.G.S. 'MONTCALM.'

In accordance with instructions I proceeded to Quebec and held an investigation, under oath, into the cause which led to the stranding of the C.G.S. *Montcalm* at Pointe

SESSIONAL PAPER No. 21

Au Maurier, on the morning of the 22nd ultimo. I fully inquired into the whole matter, and have to report that no blame is attached to the captain or officers of this vessel. The casualty was a fortuitous accident, and the ship struck on an uncharted rock; all precautions were taken, she was going slow at the time, the lead was being used and lookouts were stationed.

In following out the instructions as laid down by the St. Lawrence Pilot, Seventh Edition, 1906, the course directed to be used in entering Wataghestic Sound leads directly over the rock which the *Montcalm* struck. There is a depth of twelve to fourteen feet on the rock, surrounded by depths varying from twenty to twenty-six fathoms; bearings and distances exactly locating the position of this rock were taken by the captain and officers, and there is no doubt in my mind that everything was done that possibly could be done for the safe navigation of the vessel.

Captain Belanger and his officers are therefore exonerated from all blame and a formal investigation into this matter is not necessary.

DECISION OF THE COMMISSIONER AND NAUTICAL ASSESSOR *re* STRANDING OF THE
SS. 'MOUNT TEMPLE.'

The stranding of the ship occurred on Monday, December 2, 1907, at about 2.44 in the morning.

It appears from the evidence that the captain had a good position in leaving Cape Pine, Newfoundland, and that he had sounded on the morning of December 1, to verify his position in crossing the banks, and also that he had partial observations after noon on the same day. In the evening of that day there were a few snow squalls previous to midnight, and while it seemed clear on the horizon at midnight, the evidence shows that it was overcast. Although the captain had considered that he had taken sufficient precautions throughout the day to ascertain his position, and therefore felt confident at midnight that he knew his position, we find that there was want of prudence on his part under all the circumstances in this case, in omitting to take soundings when approaching the coast. Considerable evidence was given to show that there was an unusually strong current during that evening and also that there was a tidal wave, but we cannot find that the influence of these phenomena caused the stranding of the ship. If soundings had been taken at eight o'clock in the evening of December 1, and again at midnight, the captain would have found that the position he had taken from the reckoning was not correct, and that the ship was experiencing some unusual current, and having thereby obtained this knowledge he would not have left the deck while steering a course which he would then know was carrying the ship toward the land.

Notwithstanding the fact that Captain Farrell of the *Sylvia*, a mariner of long experience, who was also approaching the same coast, and on practically the same course, on the night in question, testifies that, with the weather then prevailing, and where an observation had been taken at noon, he would not think it necessary to have been sounding, we nevertheless consider that sounding should have been taken at eight o'clock and midnight, and that the captain of the *Mount Temple* was in default in not using the lead under the circumstances.

We deem it our duty to place on record the fact that after the casualty had occurred the discipline on the ship was admirably maintained, and that the skill and judgment displayed by the captain, under most trying conditions in superintending the successful landing of 633 passengers in safety are worthy of the strongest commendation.

When the captain left the deck, shortly after midnight, the second officer who then took the watch, received written orders from the captain to call him if the weather got thick or hazy. There were snow-squalls between one and two o'clock in the morning and these snow-squalls were becoming heavier and more persistent as time passed. From about 2.30 in the morning until 2.44, when the ship struck, a snow-squall prevailed, and it was then snowing heavily. It must have been very thick when the ship

8-9 EDWARD VII., A. 1909

struck because the land itself was not seen by the second officer, as land, until she struck. He admits himself that if he had called the captain when the snow-squalls became frequent and prolonged the captain might have altered the course and cast the lead.

While this second officer was on duty at about 2.35 in the morning, the look-out reported a light, which the second officer took to be a vessel's light, about two or three miles off. It was a bright light and could be seen all the time after 2.35 until the ship struck. It subsequently transpired that this light was the light on West Iron-bound island, and that the ship had overrun her distance from noon about forty-two miles. When the second officer saw that bright light ahead, or nearly ahead, and assumed that it was a vessel's light, he ported the wheel without taking into consideration that that course might carry his ship upon the land. We desire to make reasonable allowance for the unexpected situation in which he found himself, but it must be noted that he was not obliged to exercise his judgment instantaneously, and he had sufficient time to enable him to come to a proper decision under the circumstances and to have starboarded his wheel and gone off shore.

On the foregoing grounds we find that the second officer was grossly culpable.

In this matter there having been no preliminary report or statement of the case, referred to in sections 780, 788 and also subsections 3 of section 801, the service of a copy of which on the certificate holder is made an essential pre-requisite to the suspension of the certificate, we have no statutory power in this case to suspend the extra master's certificate of the Second Officer Griffith Owen Lewis No. 035827, but we make these findings upon the evidence so that the certificate of the second officer may be dealt with in subsequent proceedings by the proper authorities, if such a course is deemed expedient.

JUDGMENT *re* STRANDING OF THE SS. 'YARMOUTH.'

It would appear from the evidence that Captain McKinnon in fixing his course allowed too much to the east of north for the tide, viz., N. $\frac{3}{4}$ E., the proper course being N. 2 degrees west.

The lead was only used twice—the first cast was made at 4.37 o'clock, and 18 fathoms of water found, this was eleven minutes before the steamer struck. The second cast was made at 4.43 o'clock, and 13 fathoms of water found, just five minutes before the steamer struck.

In my opinion, when it was found that the water was shoaling so quickly and the steamer going slow, it would appear that more precaution should have been taken, either by coming to an anchor or by putting the steamer on another course, say W. N. W., which would, in all probability have prevented the accident.

IN THE MATTER OF THE FORMAL INVESTIGATION INTO THE 'KILDONA' CASUALTY.

Report and decision of the Commissioner and Nautical Assessors:—

This casualty occurred on Saturday, December 14, 1907, at about 8.40 in the morning. The Nova Scotia coast was first sighted at half-past six in the morning, the ship being then abreast of the *Gull*, with the *Gull* light abeam. The weather was then fairly clear, but very hazy on the land. Previous to this time we find that the captain had been navigating the ship with all due care; that he had approached the land on the previous day and had his position well verified at this time and was then justified in running for the Brazil buoy. On getting near the position where the buoy ought to have been he was in the act of going to take cross bearings when the ship struck Brazil Rock. The sea was fairly smooth at the time and there was no indication of the sea breaking on the rock. There was not a sign of the rock.

All the evidence establishes conclusively that this buoy was not only out of position but was nowhere in the vicinity to be seen. The current was very strong at the time of the casualty. The captain had given instruction to the officer in charge

SESSIONAL PAPER No. 21

to look out for this buoy, and from the evidence given before us we find that he was justified in running for the buoy.

After the casualty occurred, every possible effort was made by the captain and his officers to save the ship and prompt aid was rendered by S.S. *Louisburg* which was specially equipped for salvage purposes, and the attempt to save the ship was not abandoned until further effort became manifestly hopeless. From the foregoing facts we consider that the captain and officers are entitled to be exonerated from any blame in connection with this casualty.

(Sgd.) W. B. WALLACE,

Commissioner.

NEIL HALL,

CHAS. W. SEELEY,

Assessors.

FINDING IN STRANDING OF SS. *LANSDOWNE*.'

Captain Geo. W. J. Bissett, commanding the SS. *Lansdowne*, testified as follows:—

After leaving Yarmouth and entering this inside passage, he slowed the ship down to half speed, steering the course as laid down on the chart, until Green island was well in sight, when he ordered the third mate, Mr. Robertson, to get the bearing of this Green island, by the standard compass, which was obtained and reported to witness (the master) who ordered the helmsman to steer S.W. by S. $\frac{1}{2}$ S. (S. $2\frac{1}{2}$ points W.) which was direct to the island, plain to be seen, and also ordered the boatswain at the same time to his station, to keep the lead sounding, the ship taking the bottom as the boatswain was about casting the lead, the tide being at this time, one hour and twenty minutes from low water, sea was smooth, the ship hard and fast on the bottom, until flood tide gave sufficient water. Ship coming off showing no evidence of being stranded or of leaking, nor has any further evidence of same shown at this date.

To questions as to whether the ship's standard compass was correct magnetic, the witness stated that the compass was found to be correct some little time before, and again two days after the accident.

The third mate, Mr. Robertson, was put on the stand, his testimony fully confirming Captain Bissett's declaration. After this the line of bearing as stated for Green island (S. $2\frac{1}{2}$ points west) was laid down and found to clear the shoal on which the *Lansdowne* took the bottom, thereby making it evident, that either a mistake had been made in the bearing of Green island, or that the ship's standard compass was not correct magnetic.

The latter I am inclined to believe was the case, because the shoal on which the ship took the bottom is not on the line of bearing S. $2\frac{1}{2}$ points west, which was the course claimed to be steering when heading for Green island, at the time she ran aground.

If this be not the cause, then evidently there must have been a mistake in the bearing given, which should have been S. by west $\frac{1}{2}$ west, instead of S.W. by S. $\frac{1}{2}$ S. This error should have been discovered the moment the ship's head was brought to bear direct for Green island.

S.S. 'COBAN' CASUALTY.

(1) The S.S. *Coban* had her engines stopped in rounding the Bunker Island Light and the strong current of the ebbing tide nipped her starboard bow putting her across the channel over towards and upon the edge of Sallows Rock shoal. The deepest water of the channel is midway between Bug Light and Sallows Rock.

(2) The captain and officers said ship was considerably nearer Sallows Rock than the Bug Light; and the ship striking bottom on starboard side confirms this statement.

(3) *Coban's* bottom on starboard side caught an obstruction on the rocky bottom,

8-9 EDWARD VII., A. 1909

presumably a boulder that had been moved out of position by the then recent attempt of the dredge *W. S. Fielding* to deepen the bottom along the west side of the flats down to and past Sallows Rock.

(4) The pilot should have known the deepest part of the channel and should have insisted on the S.S. *Coban* keeping to the line. He knew the current runs out strong near low tide and that the working channel is then narrower. The pilot was certainly blameworthy for not keeping the ship in the deepest water. He asked what water the ship drew and was told by Captain MacPhail 16 ft. 10 in. aft; with 18 ft. or 19 ft. at low tide in channel. The pilot would have known that only the centre of the channel was safe. Instead of that he allowed the ship to ground where the leadsman half an hour later found $2\frac{3}{4}$ fathoms at ship's sides.

(5) Mr. Thomas Doane, the pilot, is lighthouse keeper and fog alarm engineer at Cape Fourchu but he is not a certificated pilot. He has not been to sea for 30 years and is not known by Harbour Master Scott to have been an officer on any sailing ship. Of steamers and handling them, his action on the *Coban* indicates ignorance.

(6) There is no competent pilot in or near Yarmouth obtainable for a ship wanting to enter the harbour; I beg to suggest that a pilot commission be appointed for Yarmouth and neighbouring parts, including harbours from Petite Passage, Digby to Harrington Passage.

(7) This pilot commission should have headquarters at Yarmouth with two resident members. One member for Tusket, one for Pubnico and vicinity, and one for Barrington Passage and Clarke's Harbour; west of Yarmouth, one member for Weymouth river or St. Mary's Bay and one for Westport and neighbourhood. The proviso should be stated by the Order-in-Council that the eastern members of the commission would concur in appointment of pilots for harbours east of Yarmouth and the members west of Yarmouth to control any western appointment.

(8) There is no sheet chart of Yarmouth harbour, while Ship harbour, Beaver harbour, Canse, Pictou and Pugwash have nice large charts. As Yarmouth is a leading port respecting passenger traffic, it is important that adequate charting be made and published.

SS. 'CASSANDRA' AND 'JOHN LAMBERT.'

The court, having carefully inquired into all the circumstances of the above-mentioned complaint, and, after considering all the evidence it was possible to obtain, finds as follows:—

It appears from the evidence adduced that the steamer *John Lambert* was berthed on the up-stream side of the Alexandra pier, in the harbour of Montreal, at 11.20 p.m., on the 23rd of May last; at about seven in the morning of May 24, she left this berth, in order to go into the basin, inside of the Victoria pier, where, according to the evidence, she was to unload into the SS. *Nordstjernen*; the *John Lambert* was moored at the Alexandra pier, with her bow towards the city, and the captain, in his evidence, says that, as she was being swung round in the basin, above the said pier, in order to enable him to head down stream, the *Cassandra* was noticed coming out of Windmill Point basin, manœuvring, in order to turn, and go down stream, also; it is very clear, from the evidence, that both ships were, therefore, proceeding down the river, the *John Lambert* being some short distance ahead of the *Cassandra* and on her port bow; the vessels proceeding at a moderate rate of speed. The master of the *Cassandra* gave one short blast with his whistle, and ported his helm, in order to enable him to take up his proper position, on the starboard side of the channel; the evidence of the crew of the *John Lambert*, at this point, was, that they had not heard this first blast, given by the *Cassandra*; however, whether this signal from the *Cassandra* was heard or not by the *John Lambert*, the master of the latter vessel gave two short blasts with his whistle, signifying to the vessel astern, according to article 28 of the Act respecting the Navigation of Canadian Waters, that he was directing his course to port, but, instead of carrying out the manœuvre, as indicated by his signal, he did exactly the opposite, that

SESSIONAL PAPER No. 21

is to say, he ported his helm, going to starboard, and running directly across the bows of the *Cassandra*. The evidence, at this point, in regard to the distance the two vessels were apart, is very conflicting, the evidence of three of the witnesses for the *John Lambert* contradicting the evidence of seven of the witnesses for the *Cassandra*; the *John Lambert's* witness saying that the vessels were so far apart that at no time was there danger of collision; the court, however, attaches great importance to a disinterested witness, that is to say, the master of the tug *Lucia*, who says that he was ahead of the *Cassandra*, and connected with her by one hundred and fifty feet of a tow line, and that he had to let go his tow line, as, otherwise, if he had not done so, the *Lucia* would have struck the *John Lambert*.

The master of the *Cassandra* immediately took prompt action to avert what he considered would be a collision with the *John Lambert*; he reversed his engines, let go both anchors, and sounded three blasts of his whistle to signify that he was going full speed astern. The court considers that, by this action, a collision was averted and the *John Lambert* passed safely across the *Cassandra's* bows, proceeding up-stream and into her berth.

The master of the *Cassandra* had no intimation of the intention of the *John Lambert*, to deviate from the course he was pursuing down stream, and, when he was misled by the signal of the vessel, a collision was imminent and he took every means to prevent it.

The master of the *John Lambert* does not offer any valid reason for his serious and dangerous breach of the rules of navigation and his excuse that he thought the rules of navigation on the Great Lakes applied to the harbour of Montreal, does not exonerate him in any way, as the rules of the road for the Great Lakes (see Section b. of Article 28) distinctly state that two short blasts means 'I am directing my course to port.'

The court is, therefore, of the opinion that the master of the *John Lambert* was in grievous fault, and that a serious disaster might have occurred, owing to his actions—and would have occurred—if it had not been for the prompt means which the master of the *Cassandra* took to avert it.

The court desires to bring to the notice of the authorities that Dennis T. Sullivan, of Duluth, Minnesota, master of the steamer *John Lambert*, holds a United States license as master of steam vessels for the Great Lakes, and tributaries, and as first class pilot between Chicago and Duluth which bears an endorsement, extending the license to the St. Lawrence river as far east as Ogdensburg; therefore this vessel, not having a branch pilot on board, was absolutely without an officer of any sort whose certificate or license would entitle her to navigate the waters where the casualty nearly occurred, the mate's license reading only as far east as Ogdensburg also. This, the court considers, a very serious matter and it is not an isolated instance as, in most cases which have been brought to the attention of the court, United States vessels, of this description, navigating Canadian waters east of Ogdensburg, are in the same category.

In addition to the above, the court is of the opinion that the *John Lambert* was liable for compulsory payment of pilotage, and in moving without a pilot, contravened the Montreal Harbour Commissioners' by-laws, and makes it compulsory on all vessels to pay dues for the services of a branch pilot when moving into or out of the harbour of Montreal.

The master of the *John Lambert*, holding a United States license, is outside the jurisdiction of this court even if his license were good east of Ogdensburg, and the court suggests in this case, that some action should be instituted against the master of the *John Lambert* under Section 924, of Chapter 113, of an Act entitled 'An Act respecting Shipping in Canada.'

O. G. V. SPAIN,
Wreck Commissioner.

I concur:

(Sgd.)

JAMES RILEY,

Superintendent of Pilots and Master Mariner.

8-9 EDWARD VII., A. 1909

SS PRESCOTT AND HAVANA.

The court, having carefully inquired into the circumstances of the above-mentioned casualty, and after considering all the evidence it was possible to obtain, finds as follows:—

It appears from the evidence adduced that the ss. *Havana*, on the evening of the 2nd of July last, arrived at the entrance of lock number one, Lachine canal, and put two men ashore, to look after the lines, which were to help the vessel through the lock: at this moment the lockmaster gave orders to the master of the *Havana* to allow the ss. *Prescott*, which was following her, to go ahead, in accordance with paragraph c, section 19, of the regulations for the Dominion canals; to execute these orders the *Havana* went alongside, and made fast to a barge, which was moored on the south side of the entrance to the canal, so as to allow the *Prescott* to pass, the *Havana* overlapping the barge a portion of her length. According to the evidence, at this time, the *Havana* was within 150 feet, approximately, of the canal gate; the *Prescott* passed the *Havana*, and arrived at the entrance to the gate; Alfred Ouelette, who was in charge of her at the time (the master being down below) gave the signal to stop and reverse, by pulling two bells, but, finding his vessel still going ahead, he endeavoured to communicate with the engine-room, by pulling the forward bell, and also the port bell; he then gave two blasts of the whistle, which, he presumed, the engineers would understand meant to reverse, and, at the same time, he called down into the engine-room for the engineer to stop and reverse the engines; the *Prescott*, however by this time, had too much way on, and smashed into the upper gates of the lock; the rush of water caused by the smashing of these gates was enormous (as there was a difference of some twelve feet in the level of the upper basin); this rush, which lasted for about thirty seconds, carried the *Prescott* back at the rate of some fifteen miles an hour, her stern striking the port bow of the *Havana*, about fifteen feet from the stem, driving her on to the north pier, as the *Havana* was heading for the north side of the dock, causing considerable damage, and necessitating her being beached at the south end of the Bickerdike pier, where she sank.

The accident was caused by the wrong signal being communicated from the upper deck of the *Prescott* to the engine-room, the gong only striking once, instead of twice, as the officer in charge of the *Prescott* at the time intended; the reason for this being, that the spring on the hammer of the gong in the engine-room broke, after the first stroke was given.

Ouelette, from the evidence, apparently did everything in his power to stop the way of his vessel, when he found that his orders to the engine-room were not being carried out, and that, instead of the speed of the *Prescott* being lessened, it was increased; but the court considers that this speed was too great, even before he attempted to give the signal to reverse the engines, it, evidently, being his intention to stop the way of the *Prescott* by her engines, instead of with lines, as laid down in sections 5 and 26, of the Regulations for Dominion Canals.

Section 621, chapter 113, of an Act respecting Shipping in Canada, distinctly states that there should be some approved arrangement to repeat back the signal from the engine-room to the deck; in the case of the *Prescott*, as far as the court has been able to ascertain, there was no arrangement, approved or otherwise, by which a signal could be repeated back; whether such a repeating signal would have avoided the casualty in this case the court is not prepared to state, but it is the duty of the owners to provide their ship with the proper appliances, and equipment, for her navigation; and it is negligence on the part of the master to proceed on his voyage without them. The Act provides that all passenger vessels shall be equipped with certain mechanical devices, and the inspector of hulls overlooked the fact that the *Prescott* was not provided with a means of repeating signals from the engine room.

As far as the steamer *Havana* is concerned, if she had been allowed to proceed on her way into the lock, the probabilities are that no accident would have occurred, but at the last moment she was instructed by the people in authority to give way to the

SESSIONAL PAPER No. 21

Prescott; she immediately endeavoured to carry out these instructions in the best and most convenient way, and made room, as far as possible for the *Prescott* to pass her, by going alongside the barge aforesaid and, although her actions were not in accordance with paragraph (d) of section 19 of the regulations for Dominion canals, which says that she should not have been at a less distance than three hundred feet from the entrance to the lock, the court is of opinion, taking all the facts of the case into consideration, and the short time at the disposal of the *Havana*, that the local conditions were such that it was impossible for her to do otherwise. The court, therefore, considers as follows:—

(1) There should have been repeating signals from the engine-room to the deck of the *Prescott*;

(2) The master of the *Prescott*, that is to say if Captain Dunlop is considered master of the vessel—which the court presumes he is—should have been on deck at the time when his vessel was passing through the lock;

(3) The engineer of the vessel is not responsible, in any way for the casualty as he carried out the orders received by him, in obeying the signals from the deck;

(4) The court concludes from the evidence that the bells, spring, gong, &c., in question had been inspected on occasions and that the breaking of the spring of the hammer in question could not have been foreseen; but, as before stated, there should have been some means of repeating the signal from the engine-room to the deck;

(5) Section 26 of the regulations for the Dominion canals, distinctly states that a vessel of over two hundred tons, in navigating the canals, shall be provided with four good and sufficient hawsers, two laid astern, one laid ahead, and one breast-line, and each hawser shall be attended to by one of the crew to check the speed of the vessel while entering the lock. These rules do not appear to have been carried out.

The court censures Captain Dunlop for not seeing that the proper equipment was on board his vessel and also for the vessel proceeding at too high a speed when entering the lock; although the court is aware that Captain Dunlop was not on deck at the time, it is considered that, as master of the vessel, he should have been. The negligence of the inspector of hulls, in reference to the lack of repeating signals from the engine-room to the deck is brought to the attention of the Department of Marine and Fisheries, and the court also considers, as before stated, that it is the duty of the owners to see that the vessel is supplied with all proper appliances and equipment. No blame is attached to the owner and master of the steamship *Havana*.

O. G. V. SPAIN,
Wreck Commissioner.

I concur:

(Sgd.) A. HAWKETT,
Master Mariner.

JUDGMENT IN THE 'ROSALIND' AND 'SENLAC' COLLISION CASE.

The court in this case is of opinion—judging mainly from the statements of Captain McKinnon of the *Senlac*:—

First.—There was carelessness in the captain and officers of the *Senlac* not noting the time of leaving the wharf at Halifax.

Second.—There was gross recklessness in pushing the *Senlac* down Halifax harbour in dense fog at speed of 7 or 7½ knots per hour as stated by the captain, when the ship's utmost speed was 9½ or 9¾ knots. This rate was ordered by Captain McKinnon setting the telegraph at 'full speed ahead' shortly after leaving the wharf and not making any change even when he heard the whistle ahead of the incoming steamer.

Third.—Captain McKinnon's notice to the other steamer that he was going to starboard, by the blowing of one short blast, which was duly answered, should have been obeyed; and had the *Senlac* kept to starboard with resultant collision she would

8-9 EDWARD VII., A. 1909

have been exonerated. When the alleged two short blasts were made (if made) the two ships were too close, even had the weather been clear, to avoid collision. (This seems not to be a fog signal but for vessels in sight).

Fourth.—The *Senlac* was entirely in fault in going to port and thus crossing the bow of the *Rosalind*.

Fifth.—The *Rosalind* took proper precautions in coming up Halifax harbour; and did all possible during and after the collision.

SS. 'PRINCE GEORGE' AND BARQUE 'LOWWOOD.'

Shipping Casualty.—In the case of the collision between the Dominion Atlantic Railway SS. *Prince George* and the Canadian Barque *Lowwood* in Yarmouth harbour, Tuesday, July 30, 1907.

In obedience to departmental order by telegraph by August 9, 1907, I gave notice of preliminary investigation to be held in Yarmouth.

At 10.15 a.m., of August 17, in the Supreme Court House, Yarmouth, I subscribed and read my oath of office herewith forwarded as required by statute and declared the Court of Inquiry (preliminary) open to receive evidence. George Bingay, Esq., K.C., appeared for the Dominion Atlantic Railway. (Mr. Gifkins, the general manager of said company, was also in attendance). Captain Issac Rodenhiser, owner of the *Lowwood*, also appeared in the interest of the barque.

I examined under oath Captain Rodenhiser and three others on his behalf, and also Captain McKinnon of the *Prince George* and six others on behalf of the colliding steamer. All this testimony I took down Saturday, 17, and Monday, August 19, and beg to forward two copies of the same as the material facts in the investigation. At Manager Gifkins' request, I received a blue print of Yarmouth harbour and beg to attach it to the report as tending to show the locations referred to in the evidence.

The parties to the collision had previously adjusted and settled; the Dominion Atlantic Railway paying Captain Rodenhiser \$2,750 and furnishing the barque free wharfage while repairing. At the opening the question was asked me and I declined to interfere with any arrangement that had been already completed.

The facts of the casualty are briefly as follows:—

The *Lowwood*, a spruce barque of 1,091 tons net, built in St. John, N.B., some 29 years ago and had been mostly in foreign trade, was owned by Captain Issac Rodenhiser of Bridgewater, N.S., some fourteen months previously. He, as master, brought barque from Portland, Me., in ballast to Yarmouth to load lumber for Buenos Ayres, Argentina; took on full cargo 936 M.; barque then drew 20 feet forward and 20½ ft aft, and made very little water before collision. While barque was loading Captain Rodenhiser had several conversations with Harbour Master Captain Eben Scott, who told him to go if waiting for a crew to certain stakes in a creek up into the flats on west of channel opposite Bunker island, where stakes or dolphins are kept by private owners at which vessels moor. This was done. This mooring place is styled 'the Stakes.' The harbour master stated he counted on the vessel loaded drawing 17 ft. However, the 20 ft. draft caused the barque to ground and careen badly off from the stakes and the owner employed tug boats to bring the barque out to the channel of the harbour north of Bunker island (east end) and anchor her with two anchors from the bow, which pointed to eastward (Bunker island). The starboard anchor to southwest had 20 fathoms chain and the port anchor to northeast had 15 fathoms to hold barque and she swung with the changes of the tide. At low water the channel there from bank to bank is about 450 feet and the hull of the *Lowwood* is 186 ft. Capt. Brush of the tug-boat who anchored the barque, said her two anchors were dropped about 75 feet from the bank and about 150 ft. apart.

Tuesday morning, July 30, was foggy with light winds from south and eastward. Capt. Rodenhiser was aboard the barque and came on deck 7.30 a.m. He heard the whistle of the *Prince George* off in the fog an hour before seeing the steamer rounding Bug Light into the channel. Fog had lifted going seaward giving those on the barque

SESSIONAL PAPER No. 21

better chance to see the steamer than for those on the steamer to see the barque. However, Capt. McKinnon of the *Prince George* heard the bell of the *Lowwood*, but did not see the barque till about 150 yards distant and it being low tide slack water, she lay across the channel. Capt. McKinnon aimed to pass astern of the barque in a space about 60 ft. from barque to western bank. This I deem wiser than to pass the barque's bows. I beg here to quote from Capt. McKinnon's testimony. It is clear and I think correct.

'As we swung to left I saw the little steamer *Markland* coming by the *Lowwood*'s stern towards us. I then backed my steamer to avoid striking the *Maryland*, which went to left of *Prince George*. After *Markland* was passed I went ahead slow to pass the barque on starboard across her stern. Then as I neared the barque, I put my helm to starboard to swing away from the barque, and when I found my ship did not swing quickly I reversed the port engine and went ahead on starboard engine to make ship turn more quickly. Instead of turning to left as I expected, my ship turned directly opposite, *i.e.* to the right.'

The result was a collision, the stem of the *Prince George* striking and breaking the starboard quarter of *Lowwood* about three feet abaft barque's sternpost, tearing off the rail and buffalo, the deck planks near and some side planking; also breaking and damaging the poop. The rudder and sternpost were not hurt. All the injury was above water. After settlement with owners of *Prince George* the barque was brought up to Baker's north dock, where repairs are now in course, without discharging cargo.

James Ross, first engineer of the *Prince George* testified to a stoppage of the port propeller. I quote his words:—

'I was on duty in the engine-room on No. 1 platform, the second and fourth engineers were at the levers. I was not on deck and did not see the collision. Before coming to Bunker island light (Bug) our ship came dead slow, three or four knots, 55 or 60 revolutions of propellers, by captain's orders. Telegraph went to engineers below at levers, but I could see it. Weather was foggy. After passing Bug light a little bit we got some orders for different rates of speed. I remember the order telegraphed to engine room as stated by Capt. McKinnon a short time ago in my hearing. The order was obeyed as to the starboard propeller, but the port propeller would not act for about half a minute. The engineer obeyed the order. I saw the port propeller not acting and went down to the levers. I put on all the power we had, and then port propeller moved as telegraphed. I did not feel the collision or know of it. Some passengers told me.'

In all twelve witnesses were examined; four for the barque, seven for the Dominion Atlantic Railway, and one for commissioner, the harbour master.

For barque—Capt. Rodenhiser, Wm. Brush, Wm. B. Ritchie, Pius Boudreau.

For D. A. Ry.—Arthur McKinnon, James Ross, E. M. Dexter, James Crosby, Alvin Simms, Wm. McKenzie, Wellington McKinnon.

For Commissioner.—Ebenezer Scott, harbour master.

My opinion is,—

First.—That Captain McKinnon did right in passing astern of *Lowwood*, and would have done it without injuring the barque or his own ship if *Prince George*'s port propeller had worked as he ordered.

Second.—The port propeller not working when ordered turned steamer's bow to starboard and into barque *Lowwood*; consequently steamer was in fault. The cause of propeller not working is immaterial; whether mud or current or imperfect machinery or handling; neither would relieve the steamer from blame. The previous morning on the ss. *Boston* of Dominion Atlantic Railway came in safe astern of *Lowwood* lying across the channel. The *Boston* has a single screw, but great care was exercised by Captain McKenzie, as stated in his evidence.

Third.—The harbour master and other witnesses say there is no place to anchor a loaded vessel the size of the *Lowwood*. The wharfs lack the depth of water (21 or 22

8-9 EDWARD VII., A. 1909.

feet) at low tide; the Stakes the same. Yarmouth Sound outside the Bug light is dangerous and in a gale the *Lowwood* would be wrecked. Where the *Lowwood* lay must be used by large vessels loaded and riding at anchor to get crews or officers, or preparing for sea; and only one large ship can lie there at the same time. There are two railroads besides coastal vessels pouring the products of forest, farm and fisheries into Yarmouth for exportation. The day of small sailing vessels is past never to return; so we must provide for the present and near future.

Fourth.—Yarmouth harbour is congested by trading vessels and a fine passenger steam fleet in summer and autumn; in winter and spring it is a haven for banking and fishing schooners, in addition to having a regular steam packet service. If only one passenger steamer should be wrecked or be in a collision, with resulting loss of lives, thousands, perhaps tens of thousands of tourists would turn to other resorts and Nova Scotia, Cape Breton and Prince Edward Island would be the losers. The duty of parliament, it seems to me, is to have the channel dredged into a basin with room and depth of water enough to satisfy the large sailing ships and leave ample space for large passenger boats. Dolphins along the eastern channel for ships to moor at would not suffice. For part of the flats to be dredged out will make a splendid basin, easy of access and secure; and the dredged material would help make upland of the surrounding flats now covered by the water.

Fifth.—When the harbour master deems it essential for him to go down the harbour or channel to place or remove vessels interrupting the passage of ships (sailing) or steamers, the department should pay the charges of the tug or launch on certificate of the agent of Marine and Fisheries for Nova Scotia.

JUDGMENT IN IMPERIAL AND GERMAINE COLLISION CASE.

The court, having carefully inquired into the circumstances attending the above mentioned shipping casualty, and, after hearing all the evidence it was possible to obtain, finds as follows:—

It appears from the evidence adduced that the steam vessel *Sovereign* (so-called *Imperial*) is a vessel reconstructed from the wreck of the Ottawa River Navigation Company's steamship *Sovereign*, which was burnt, in March, 1906, and purchased by the present owners, the St. Lawrence Canadian Navigation Company, Limited, from Charles Sessewein; and she has been plying between the ports of Montreal, Three Rivers, Sorel and Quebec, without a proper certificate of registry, or license, since shortly after the opening of navigation. The vessel has been lengthened considerably, and been reconstructed without any special survey, though a copy of the certificate of survey, (written in pencil), signed by William Paul, surveyor for the Port of Sorel, (who is also the manager of the company), was handed into the court. In his evidence manager Paul stated that he was assisted in the survey by a man by the name of J. K. Noel, of H.B.M. Customs; Mr. Noel, under oath, denied this.

Mr. J. K. Noel, of H.B.M. Customs, whose duty it appears from his evidence is to inspect all vessels, and to see that their certificates of registry and inspection are in proper order, knew that the steamer *Imperial* (so-called) had no certificates, and yet allowed her to continue to run with passengers and cargo, between the ports aforesaid, in direct contravention of the law relating thereto; this whole matter appears to have been most irregular, and is brought by the court, to the attention of the Department of Customs.

At about 5 p.m. on August 23, 1907, the steamer *Imperial* (so-called), in charge of William Paul, senior, as master, backed out from her berth, at section No. 20, and when clear of the end of Victoria pier, starboarded her helm, to cant the vessel head down river; when orders were given to steady the helm the wheel could not be righted, and the vessel continued to move, in obedience to her starboard helm, till she struck, and sunk the barge *Germaine*; the wheel chains are supposed to have jammed in the rudder blocks, and freed themselves again when she backed out, after striking the

SESSIONAL PAPER No. 21

barge. The evidence is also very unsatisfactory, with regard to the signals to the engine-room; the master, in his evidence, states that although he knew the bells could not be relied upon, he gave the signals to stop and go astern by the bell, but, finding the engines were still going ahead, he went down to the engine-room himself, to communicate with the engineer, instead of at once using the whistle, as he was in the habit of doing, to signal to the engineer to stop and go astern, there being no means of repeating the signals, or communicating with the bridge from the engine-room, either by a repeating signal or a voice tube. Section 621, chapter 113, entitled: 'An Act respecting Shipping in Canada,' is as follows:—

'Every passenger steamboat shall be provided with wire tiller ropes, or iron rods or chains, correctly and properly laid with suitable rollers for the purpose of steering and navigating the vessel, and shall use wire bell pulls for signalling the engineer from the pilot house, where the bells are used, together with tubes of proper size so arranged as to transmit the sound of the engine bells to the pilot house, or other arrangement approved by the inspector to repeat back the signal. 61. V. c. 46. s. 32.'

The evidence proves that there was lack of discipline, and want of organization, and of regular inspection on this vessel, she was navigated in a haphazard manner.

There was manifestly a want of care taken, in reference to the equipment; the rudder chains had been foul, on previous occasions, from preventable causes, and the signal bell to the engine-room had also failed to work, on account of the members of the crew having used the bell wires as clothes lines. The Inspector of Hulls overlooked the fact that there was no system whatever of repeating signals from the engine-room to the bridge; this should have been taken exception to by the inspector, at the time of his inspection, and he should have called the attention of the owners to the omission. The defence of inevitable accident cannot be sustained. Captain William Paul, who holds a certificate as master of a passenger steamer on the minor inland waters, is severely censured and warned to be more careful in future, as the court considers that it is the master's duty to see that the steering gear, and means of communicating his orders to the engine-room, are in proper order, more espically, as stated above, similar circumstances have occurred frequently. It is also recommended by the court that the Department of Marine and Fisheries deal with the Inspector of Hulls, for his negligence in this respect.

The court therefore finds the steamer *Imperial* (so-called), her master and owners, are responsible for the sinking of the barge *Germaine*, which was providentially unattended with loss of life.

SS. 'CHARMER-TARTAR' COLLISION CASE.

The judgment we think proper to pronounce is:—

(1) That William Henry Whitely, master of the *Charmer*, should be, and is hereby severely censured.

(2) That Harry Robson Jones, pilot of the *Tartar* be, and is hereby censured.

(3) That Archibald Heurtley Reed, master of the *Tartar*, be and is hereby exonerated from all blame, and is commended for the prompt assistance given to the *Charmer* after the collision.

SS. 'NORWALK' AND 'JETT.'

The court having carefully inquired into all the circumstances attending the above mentioned shipping casualty, and after reviewing the evidence of the crews of the tug *Glide*, and the barges *Jett* and *Winnipeg*, given at Montreal on October 28, and the crew of the steamer *Norwalk*, given at Windsor, Ont, on November 16, finds as follows:—

8-9 EDWARD VII., A. 1909

From the evidence adduced the barge *Jett*, bound from Prescott for Montreal with a cargo of 21,000 bushels of flax seed, more or less, left the Soulanges canal in company with, and lashed alongside the barge *Winnipeg*, both in tow of the tug *Glide*. All went well until nearing lightship Lake St. Louis No. 2, when a steamer was seen approaching, the steamer in question (the *Norwalk*) came in contact with the barge *Jett* immediately after the tug *Glide* and her tow had rounded lightship No. 2, causing the barges to break away from the tug, and from each other, and also causing the resultant damages; the night was fine, dark, but clear, with a strong northwest wind, and lights were visible a long distance. The barges appear to have been carefully towed, and were on the south side of the channel, as the evidence shows that the barge *Winnipeg*, which was on the lee or south side of the tow, struck one of the stakes or spar buoys on that side of the channel. The steamer *Norwalk* was bound from Quebec to Detroit with a cargo of pulpwood, the deckload of which was six feet high; on the night in question. As before stated, the weather was fine with a breeze from the northwest, the officer in charge could see the shore and lights plainly, the vessel was drawing 14' 2" aft, and 13' 9" forward; she had touched the ground several times, which may possibly have caused her to steer badly, the lights of the tug were seen from the *Norwalk* and recognized as a tow when about a mile away, she, however, continued on, and immediately after the tug and the tow passing clear of the lightship, came in contact with the barge, at a point where the tow had not had time to recover after changing course to follow the tug.

The court considers that the steamer *Norwalk* is to blame for the collision, inasmuch as the tow descending with the current and with a strong wind abeam, should have been given the right of way, and the *Norwalk* should have stopped far enough below the lightship No. 2, to have permitted the tug and her tow to pass into the straight reach of channel between lightship No. 2 and Lachine lightship. The collision resulted in serious damage to the barge *Jett* and her cargo, and might have resulted in loss of life, (more especially as the steamer *Norwalk* proceeded on her course without endeavouring to find out in any way what damage she had caused) had the cargo of this barge been wheat or grain, but owing to the peculiar oily nature of the cargo of flax seed, the vessel kept afloat and drifted out of the channel into shoal water where she grounded, and the master and his sister were saved.

The court is unable to deal with the certificate of Captain Frank Goodrow, who was master of the *Norwalk* at the time of the casualty, as this officer holds a United States license, and is therefore in this respect outside its jurisdiction. The court, however, recommends that an action should be instituted against Captain Goodrow under section 924, chapter 113, of the Revised Statutes of Canada.

In regard to Mr. Henry Chesnut, who was acting as pilot of the *Norwalk* at the time of the casualty, and who holds a Canadian Masters Certificate of Competency as master of any steamer on the inland waters, granted at Ottawa, on April 24, 1884, after an examination passed at St. Catharines on March 11 of the same year, the court cannot acknowledge Mr. Chesnut as being legally in charge of the *Norwalk*, as he was not signed on the articles of that vessel, nor had he any authority to act as a pilot in the waters then being navigated at the time of the collision, as they were in the pilotage district of Montreal and consequently under the jurisdiction of the pilotage authorities of Montreal, and therefore as he was neither licensed as a pilot or an officer of the vessel, his certificate cannot be dealt with, but the facts of the case will be brought to the attention of the department.

O. G. V. SPAIN.

Wreck Commissioner.

We concur:

(Sgd.)

JAMES RILEY, /
 ARCHIBALD REED, /

Assessors.

SESSIONAL PAPER No. 21

SS. 'JESSIE HUME' AND 'CORINNE.'

The court having carefully inquired into all the circumstances attending the above mentioned casualty, finds as follows:—

That the *Jessie Hume* is a steamer with a gross tonnage of 58 tons, owned by the Dominion government and was in charge of Gustave Lebeuf who does not hold a certificate of any description; that the *Corinne* is a steamer with a gross tonnage of 23 tons, owned by the W. J. Poupore Company, Limited, of Montreal, and was in charge, at the time of the accident, of Joseph Bernier, who had no certificate whatever, and very slight experience.

It appears from the evidence adduced, and in fact it is admitted that the proper lights were burning on board the *Jessie Hume* at the time of the disaster.

On the other hand the court is of the opinion that although Joseph Dennis, engineer of the *Corinne* swears that he lit the lights and placed them in position on board that vessel some fifteen or twenty minutes before the collision, that at the time of the collision and shortly before, the lights on board the *Corinne* were not burning. Joseph Bernier, in charge of the *Corinne* at the time of the disaster, gave the order at about five o'clock, according to his evidence, to light the lights, but he did not actually see that this order was carried out, it is possible that the lights were lit and placed in position, but had gone out immediately, as there was no evidence to show when they had been trimmed last, it being apparently nobody's particular duty to attend to this matter.

The collision occurred by the *Jessie Hume* striking the *Corinne* upon her port side with her starboard bow, the *Corinne* at the time was crossing from Louisville to Pierreville, she had a crew of three on board, all more or less boys; the *Corinne* directed her course to starboard, and did not give any indication of what she intended to do either by her whistle or otherwise, although there is no doubt that the lights of the *Jessie Hume* could be seen. After the collision the *Corinne* continued her course for a short period and sank towards the north side of the channel, the fireman jumped on board the *Jessie Hume* and the other two men were left in the water when the vessel sank.

The first indication that the *Jessie Hume* had of the approach of the *Corinne* was when she loomed up about 150 feet ahead of her, with her bow inclined to cross the bow of the *Jessie Hume* to port. The *Jessie Hume* promptly starboarded, and this action, in the opinion of the court, was justifiable taking into consideration the proximity of the two vessels, and that the speed of the *Jessie Hume* was about 13 miles an hour and the speed of the *Corinne* was about 6 miles; it will therefore be seen that the 150 feet would have been travelled in fractionally about $5\frac{1}{2}$ seconds. Had the *Jessie Hume* ported her helm a more dangerous collision would have occurred, but there was a remote possibility of escape by starboarding as she did, there is no doubt that the *Corinne* saw the lights of the *Jessie Hume* and if she had indicated by her whistle what she intended doing the collision might have been averted, as the night was dark but clear and the lights were visible at a long distance.

Had the man in charge of the *Jessie Hume* noticed a green light on the *Corinne* the collision would have been averted, as he had starboarded his helm, had he seen a red light he would presumably have ported his helm, as he would not then have been limited to such a short time to make his decision.

The two men on board the *Jessie Hume*, Beauchemin and Blette, gave evidence that they saw a glimmer of a light in the *Corinne's* engine-room before the accident. This strengthens the opinion of the court that the side lights were not burning at the time, as they would be more easily noticed being located in a much more conspicuous place.

The court desires to bring to the notice of the department that there were no properly certificated officers in charge of either of these tugs, that the man in charge

8-9 EDWARD VII., A. 1909

of the *Jessie Hume* had considerable experience but no certificate, and the man in charge of the *Corinne* had little, if any experience, and no certificate.

The court is thoroughly aware that the Act respecting shipping in Canada does not apply to vessels owned by the Federal Government, still considers that on all occasions, whether the vessel in question is owned by the government or otherwise, she should be in charge of a properly certificated officer.

Taking all the above mentioned reasons into consideration, the court finds that the responsibility for the accident rests with the *Corinne*.

The court, however, desires to remark that the *Corinne* at the time of the accident was engaged in conveying a departmental engineer from place to place, and that if she had not been engaged on this particular work, she would have been with the dredge and the accident would probably not have occurred.

The court therefore recommends that the duty on which the *Corinne* was engaged at the time of the accident should be taken into consideration.

O. G. V. SPAIN,
Wreck Commissioner.

JAMES J. RILEY, /
FRANCIS NASH, { Master Mariners.
Assessors.

REFERENCE 'NETTIE B.'

In accordance with your instructions I held an investigation as far as possible into the casualty which occurred between the Canadian cruiser *Vigilant* and the fishing tug *Nettie B.* The *Vigilant* at the time was in charge of the first officer, Mr. C. J. Stewart; Captain Dunn being absent on duty in Toronto. The vessel was in Port Stanley at the time, and was endeavouring to take up her proper berth in the harbour. The officer in charge of the bridge made the signal by telegraph to the engine-room to go slow ahead, instead of carrying out this order the engineer officer in charge put the engine slow astern; half speed ahead was then rung, but it was answered by the vessel still going faster astern. Full speed ahead was then rung on the telegraph, but the vessel still continued to go astern, with the result that she backed into the tug, *Nettie B.* The third engineer, Panabaker, was working the engines, and an oiler by the name of Graham was at the telegraph in the engine-room, the accident was caused by the orders which were given by telegraph from the bridge not being properly attended to in the engine room, and the services of the officer in charge of the engine-room at the time having been dispensed with. There is no doubt that the fault of the accident lies with the *Vigilant*, as the *Nettie B.* was tied up at the wharf at the time.

O. G. V. SPAIN.

SESSIONAL PAPER No. 21

APPENDIX No. 18.
WIRELESS TELEGRAPHY.

To LT.-COL. GOURDEAU,
Deputy Minister Marine and Fisheries,
Ottawa, Ont.

SIR,—I beg to submit my annual report on the work in the wireless stations belonging to this Department.

There was a total of twenty wireless stations operated during the past year under the control of this Department, located at the following points:—

Father Point, River St. Lawrence,	Point Rich, Gulf of St. Lawrence,
Clarke City “ “	Cape Ray, Newfoundland,
Fame Point “ “	Sydney, Nova Scotia,
Heath Point, Anticosti,	Cape Sable, Nova Scotia,
Cape Bear, Price Edward Island,	Partridge Island, New Brunswick,
Pictou, Nova Scotia,	Point Grey, British Columbia,
Cape Race, Newfoundland,	Victoria “ “
Whittle Rocks, Gulf of St. Lawrence,	Pachena “ “
Point Amour “ “	Estavan Point “ “
Belle Isle “ “	Cape Lazo “ “

The wireless stations on the Pacific Coast have been completed and are working satisfactorily.

The statement attached shows the number of messages received and number handled from the different stations.

I have the honour to be, sir, your obedient servant,

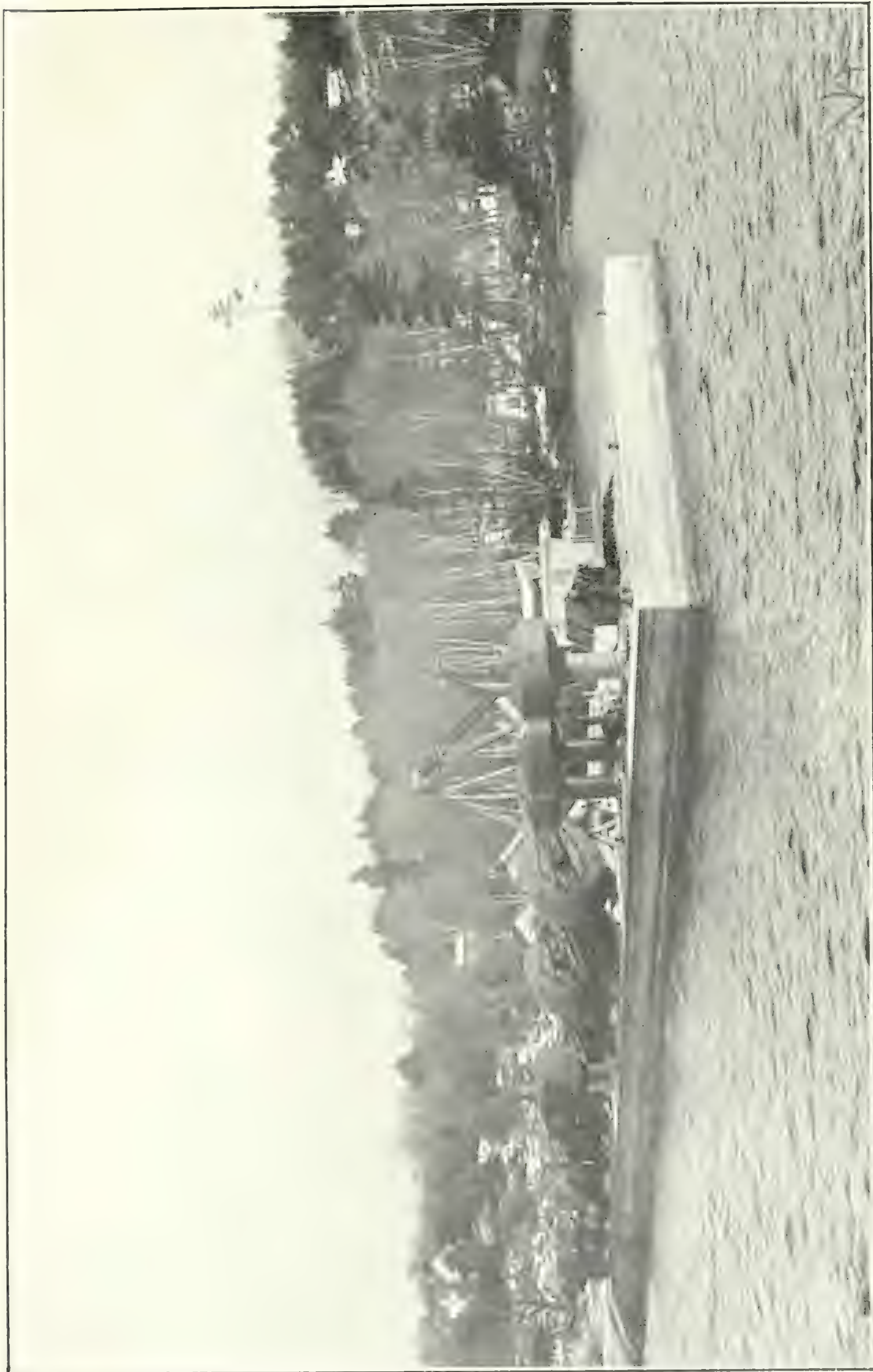
C. DOUTRE,
Supt. Govt. Wireless Stations.

WIRELESS TELEGRAPH STATIONS.

The following statement shows the number of messages received and sent from the different stations:—

	Private between Steamers.	Signal Service.	Government Steamers and Light Stations.
Cape Ray.....	1,101	808	624
Cape Race.....	2,483	2,151	113
Cape Sable.....	925	1,979	24
St. John, N. B.	24	470	300
Cape Bear.....	.....	.....	8,404
North Sydney.....	21	214	69
Point Rich.....	61	214	2,708
Fame Point.....	272	516	1,887
Clark City.	34	288	1,822
Belle Isle.....	52	305	2,031
Point Amour.....	114	225	2,447
Sable Island.....	8,118	4,935	1,023
Heath Point.....	.....	312	3,164
Halifax	72	244	143
Father Point.....	272	694	1,067
Whittle Rocks.....	.....	171	2,546
Cape Lozo.....	.....	.....	1,352
Victoria.....	.....	.....	4,152
Point Grey.....	.....	.....	1,092
Esthvan Point .....	.....	.....	1,944
Pachena.....	.....	.....	1,620
	13,549	13,526	38,532

New Parry Sound Dock.

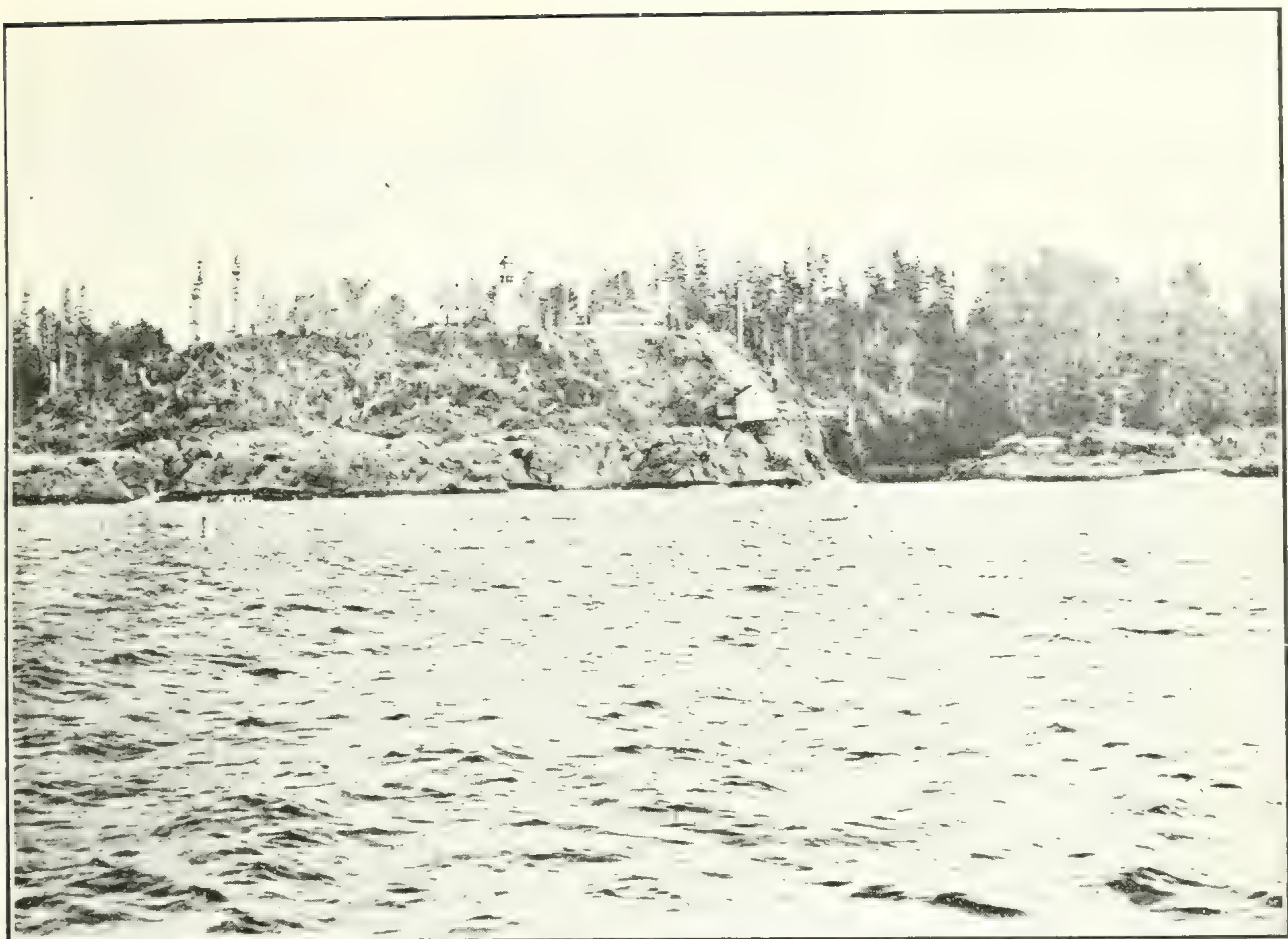




C.G.S. "Lady Grey."



Lake St. Peter, Curve No. 2, Upper Pier and Lighthouse, Looking South, April 26, 1908.
21--16½



Pachene Light Station, B.C.

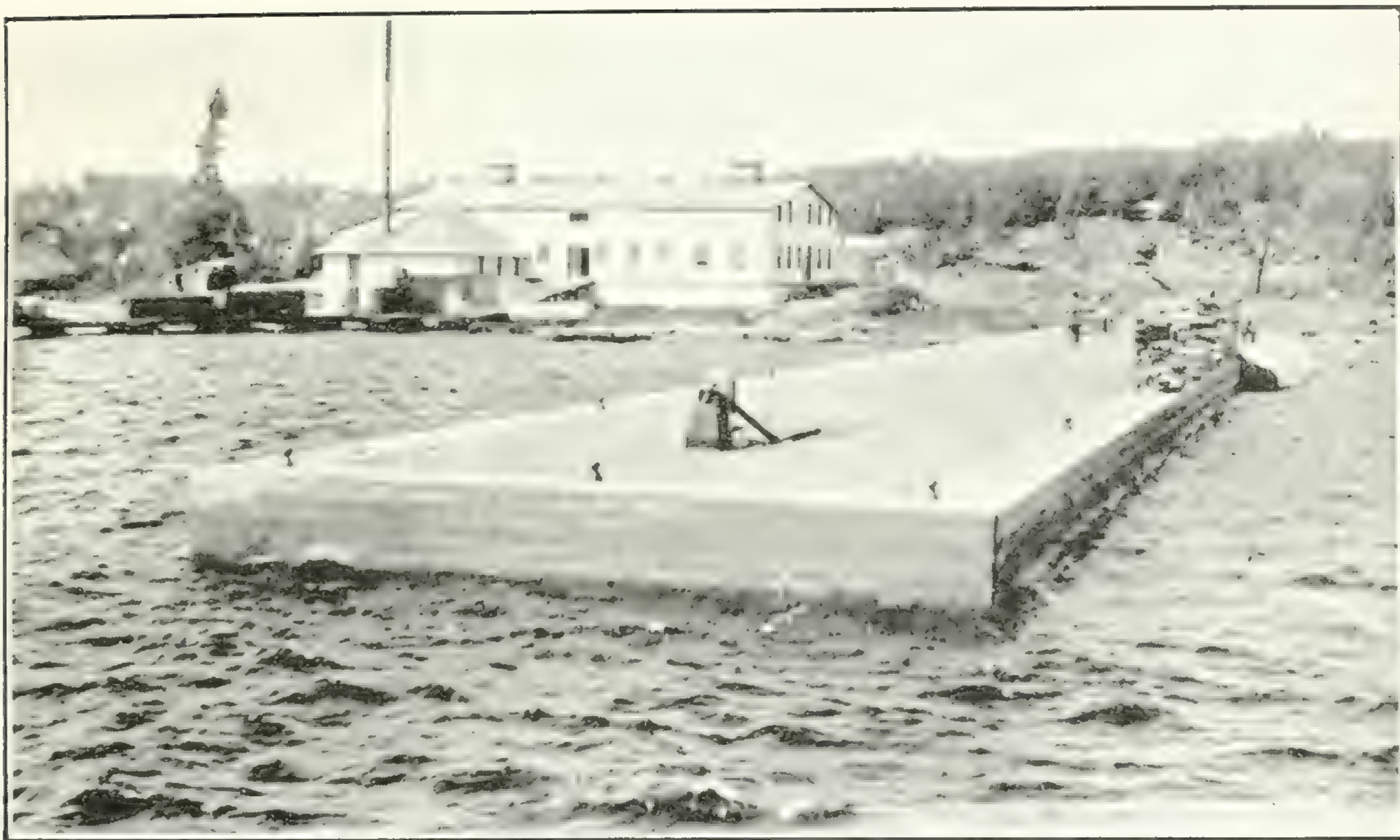




No. 18071. Spruce Shoal. Approach to Parry Sound, Foundation on Way to Position, Aug. 11, 1907.



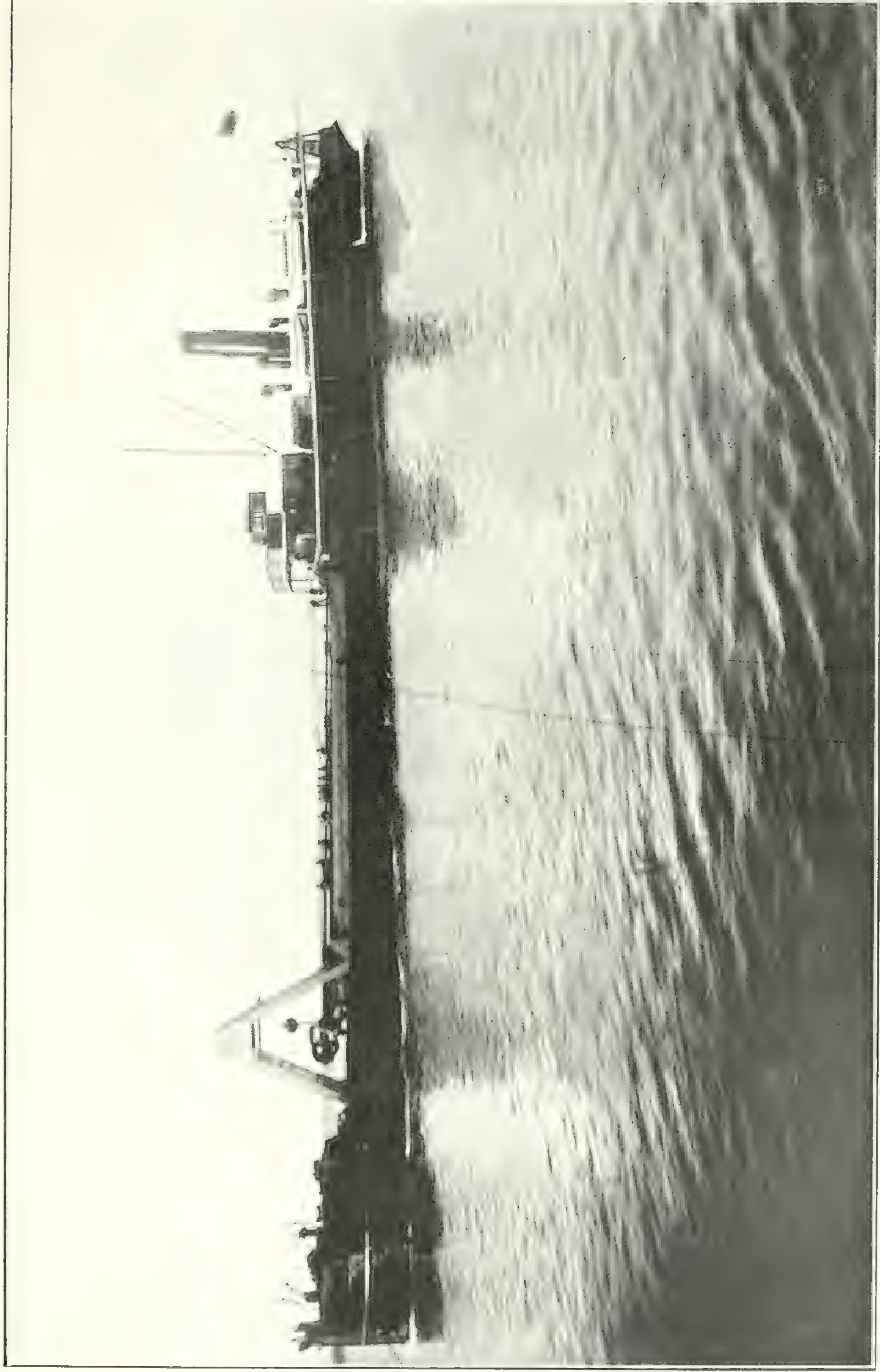
Chibucto Head, N.S., Lighthouse, Fog Alarm and Submarine Station.



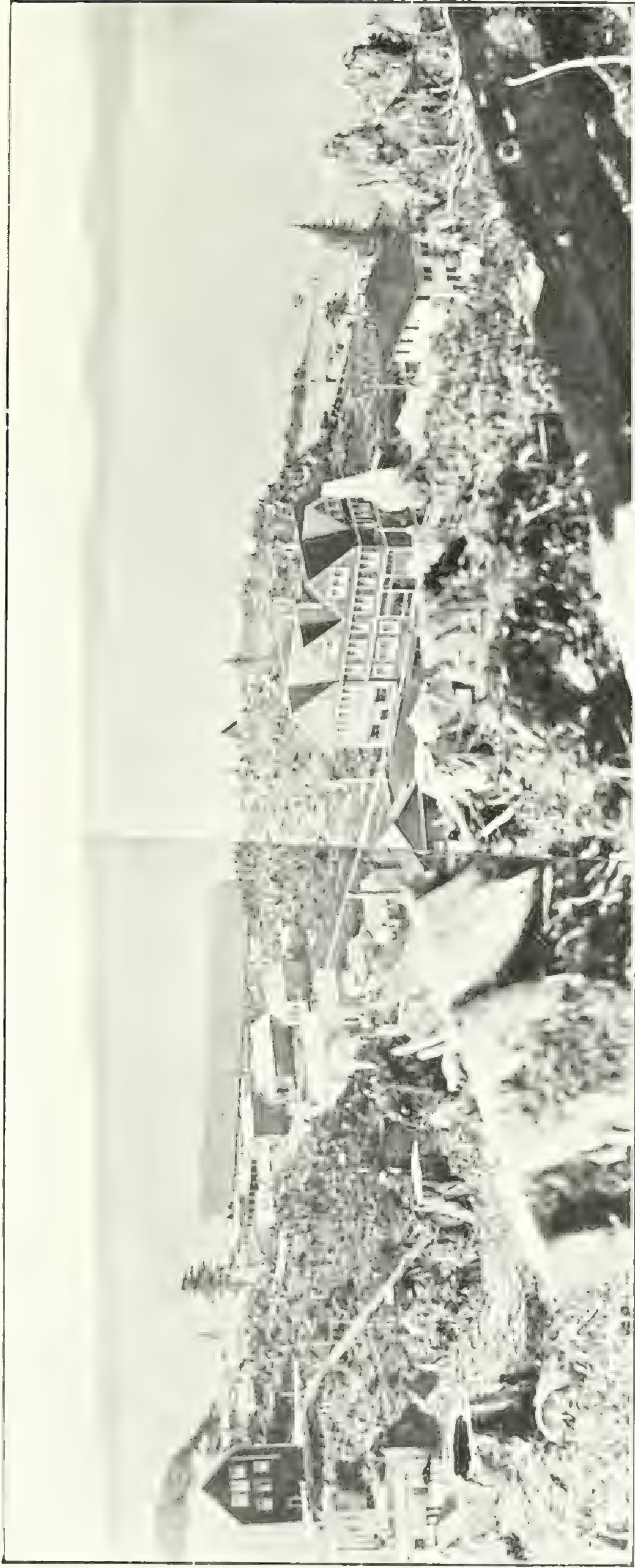
New Government Wharf, and Lighthouse Depot, Parry Sound, Ont.



Southampton New Lifeboat House, May 7, 1908.



Dredge "Beaujeu" (No. 8) after loading.

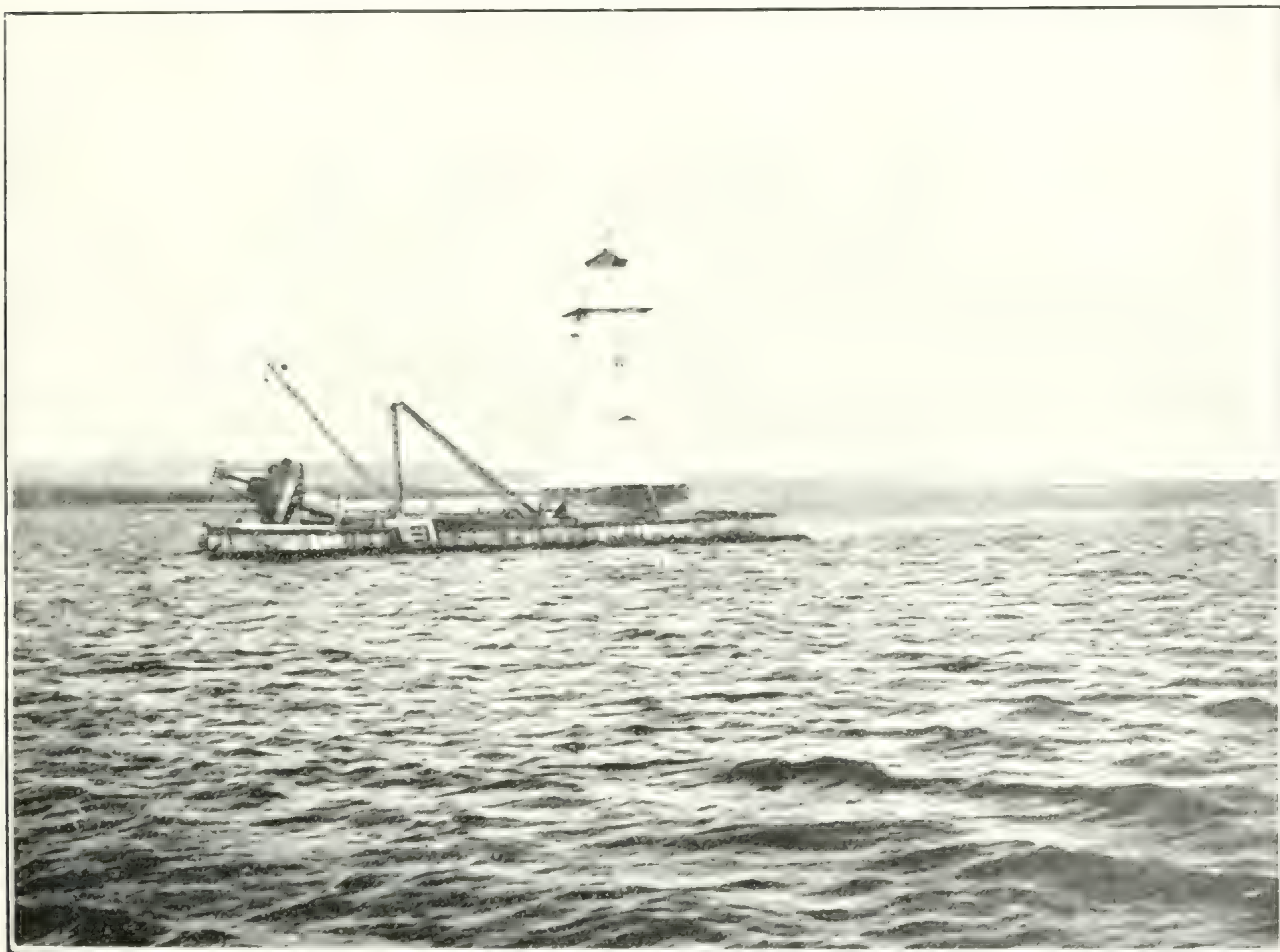


Pine Rupert Harbour, B.C.

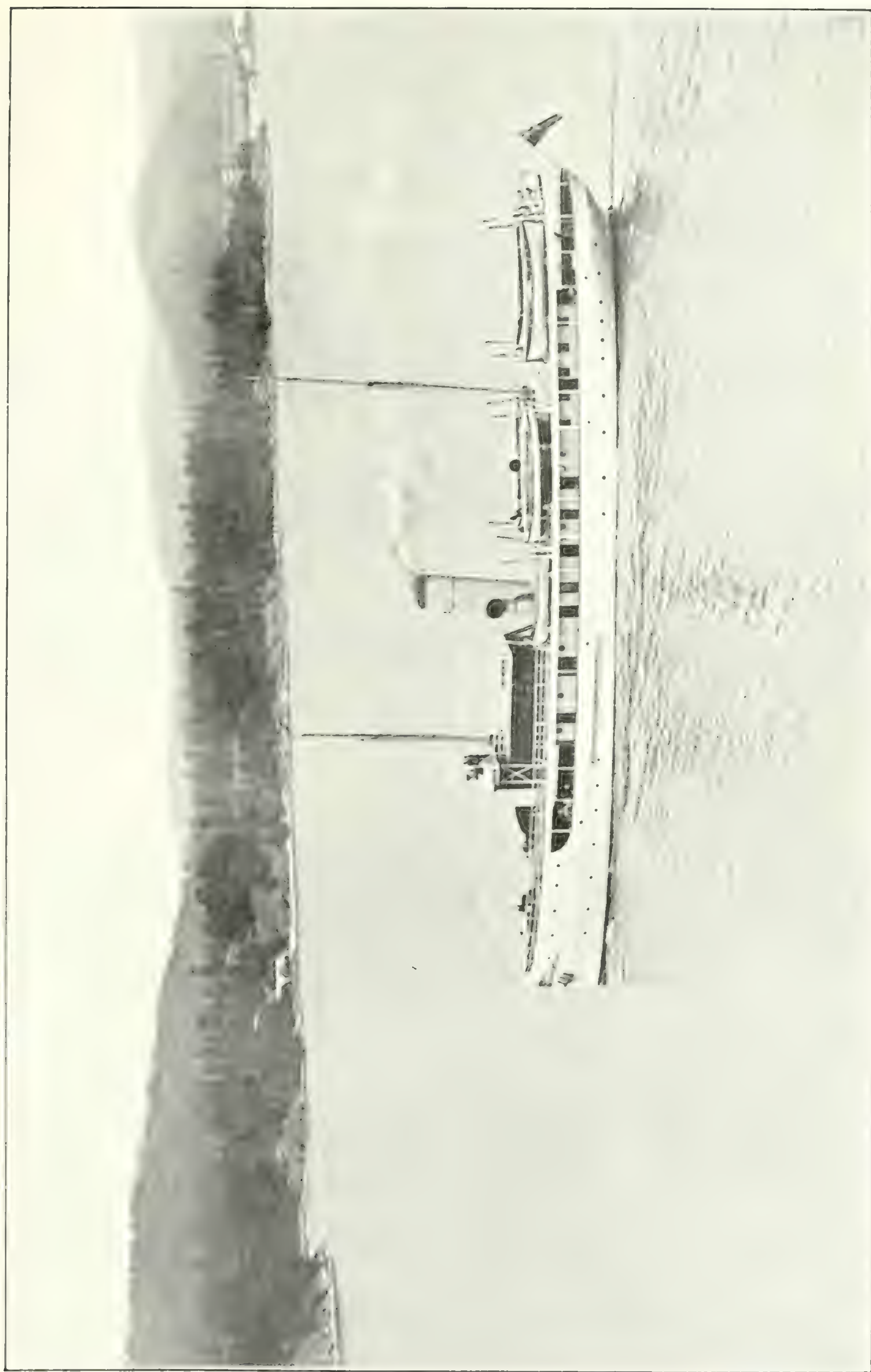


No. 19123.

Three Lightships in Tow of C.G.S. "Druid."



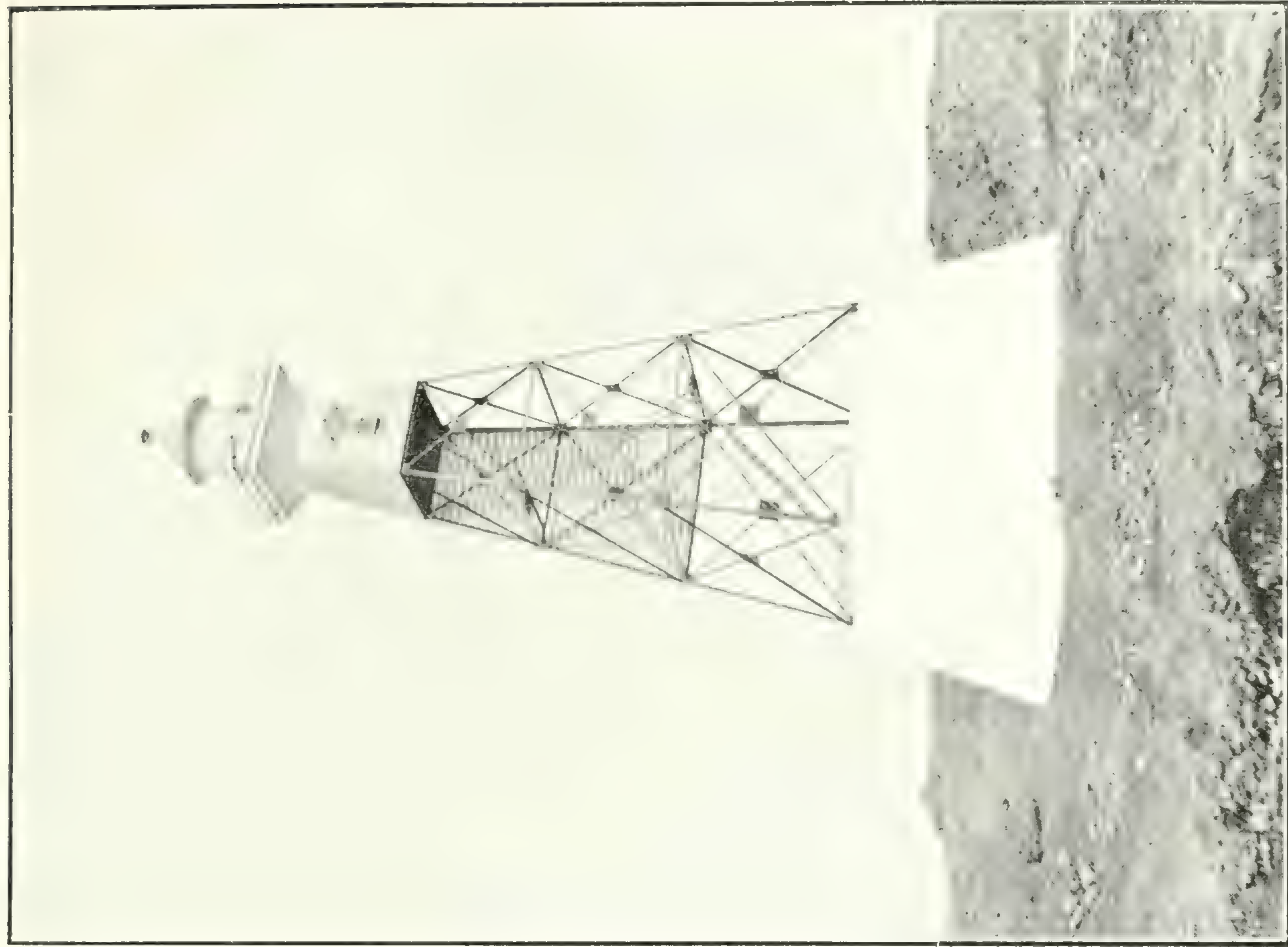
Port Arthur Lighthouse, Oct. 18, 1907.



Canadian Hydrographic Survey Steamer, British Columbia. Length 172 ft., Breadth 27 ft., Depth 15 ft. Twin Screws, Built 1907-8.



Placing Submarine Bell on Tripod.



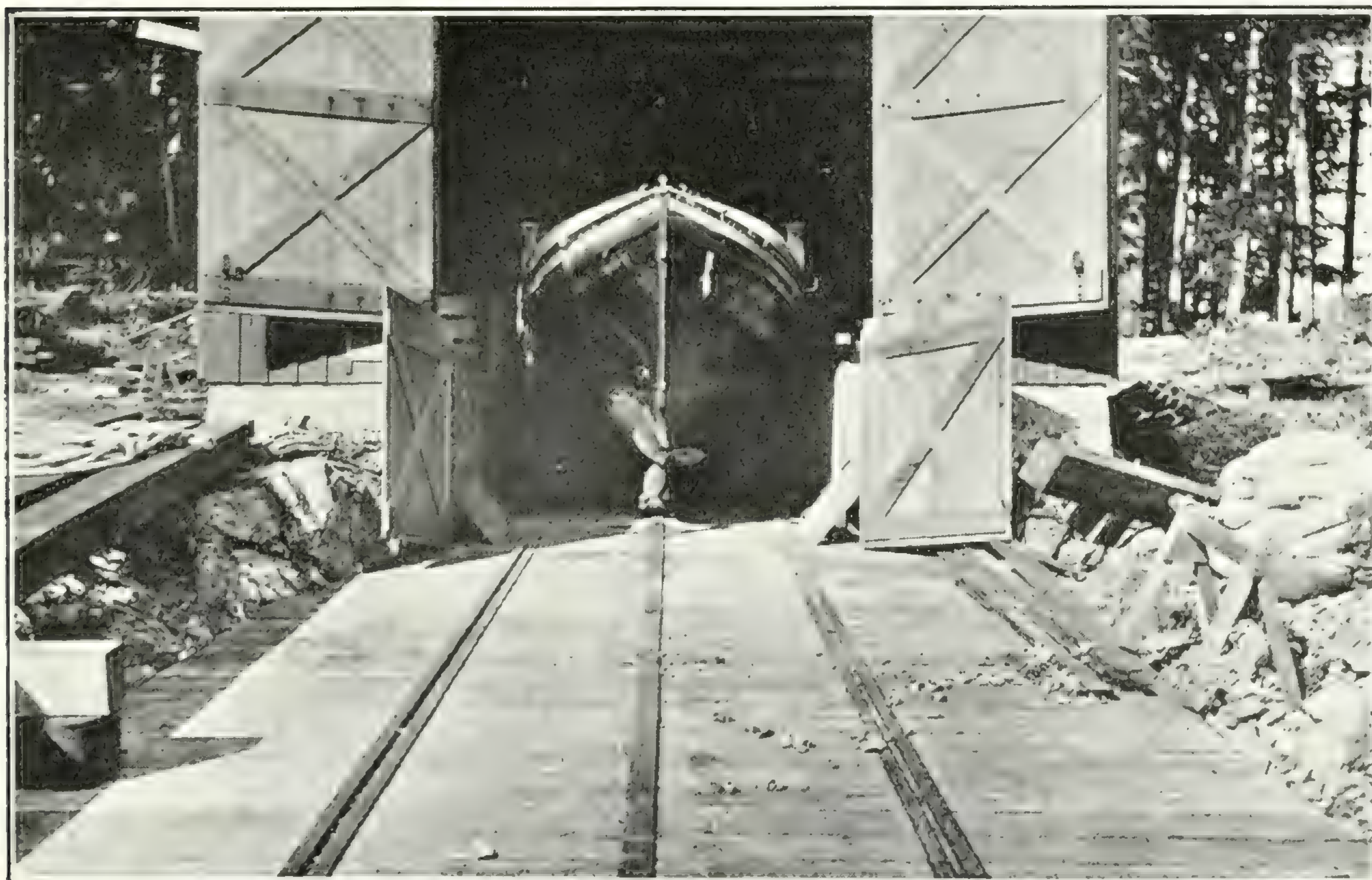
Guard Pier Lighthouse, Montreal, Que.



Combined Gas and Whistling Buoy in Tow. Light 30 Feet Above Water.



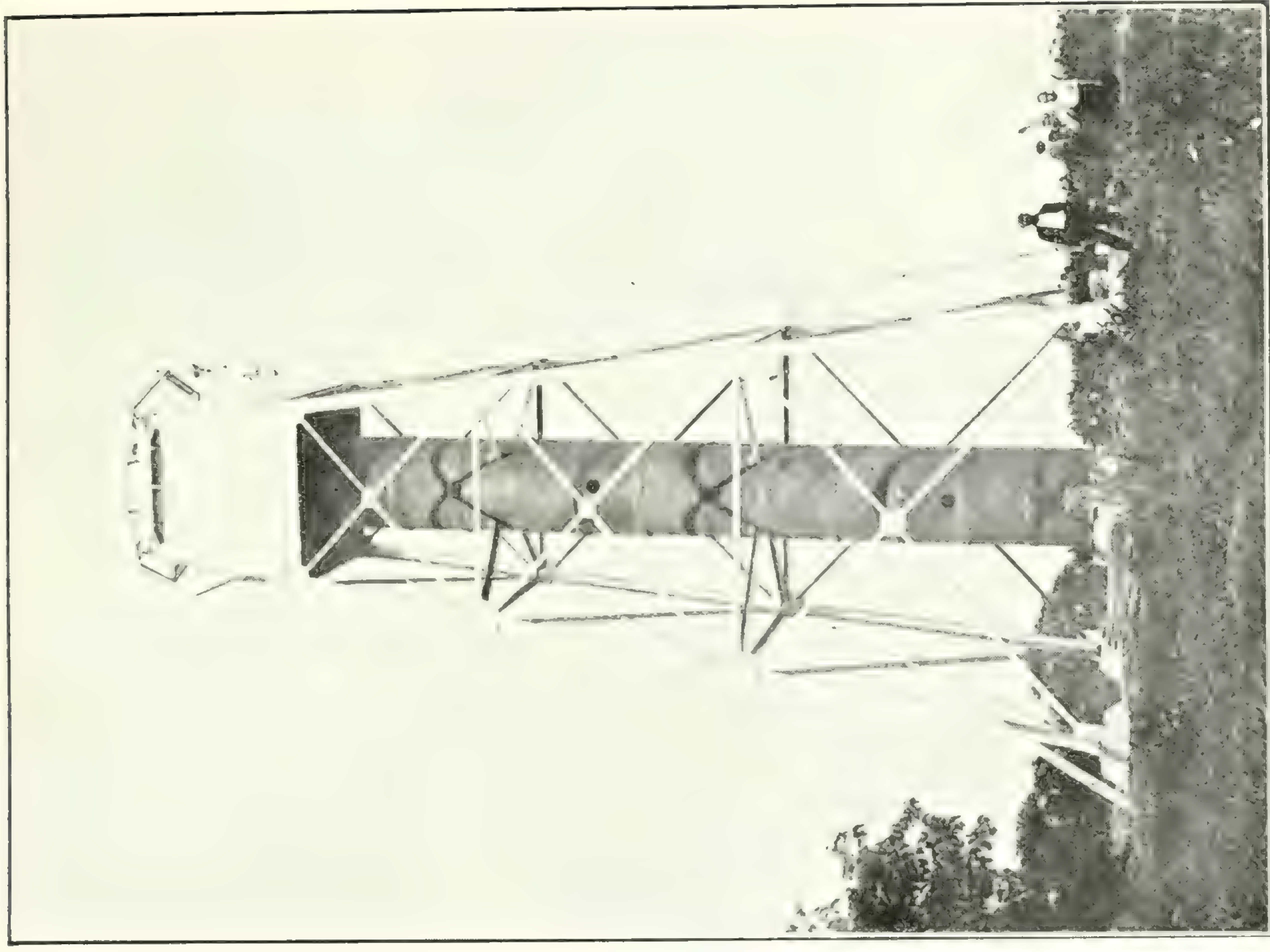
Banfield, B.C., Lifeboat and Boathouse.



Banfield, B.C., Lifeboat and Boathouse.



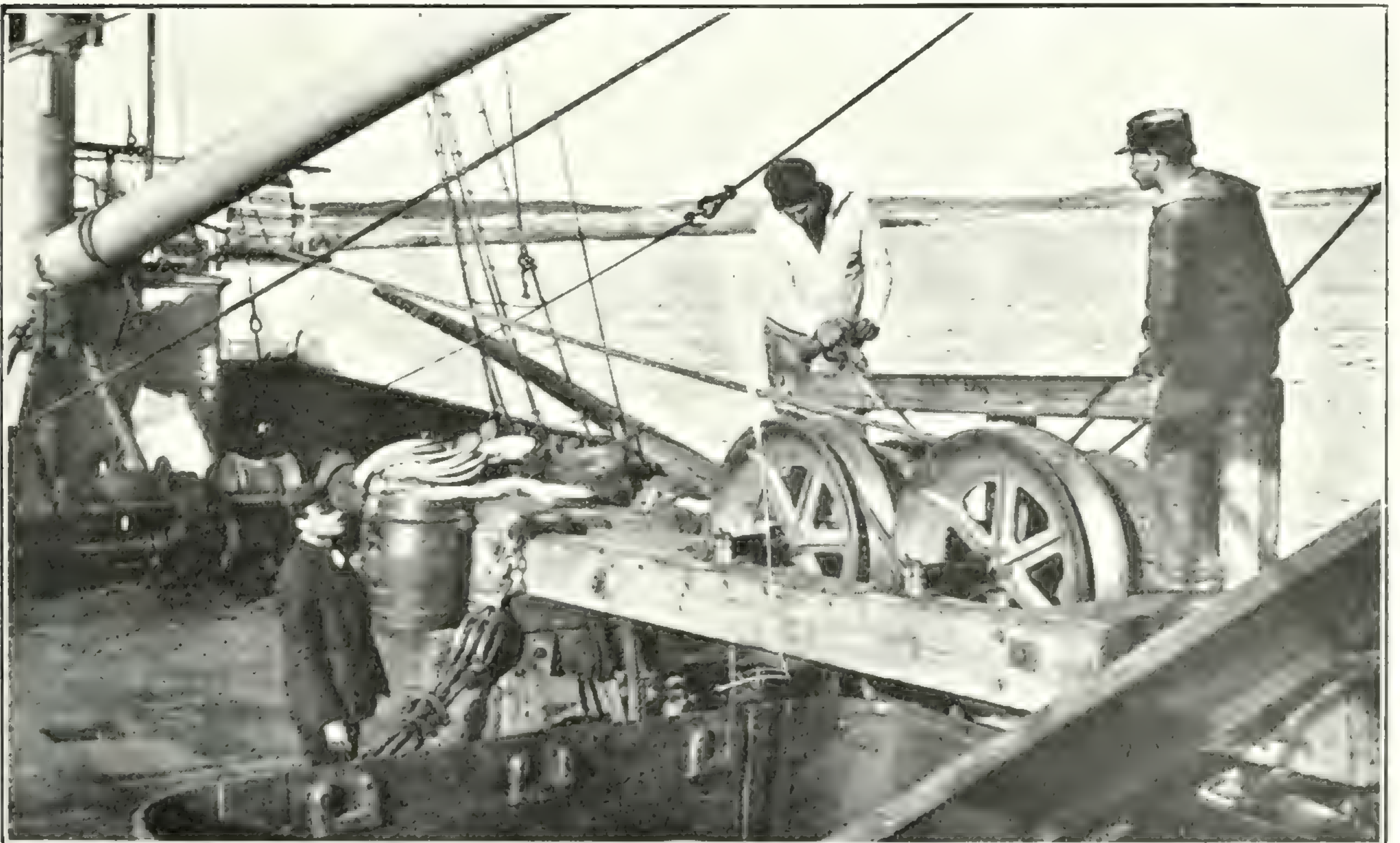
Hope Island new fog alarm and reinforced concrete chimney. June 6, '08.



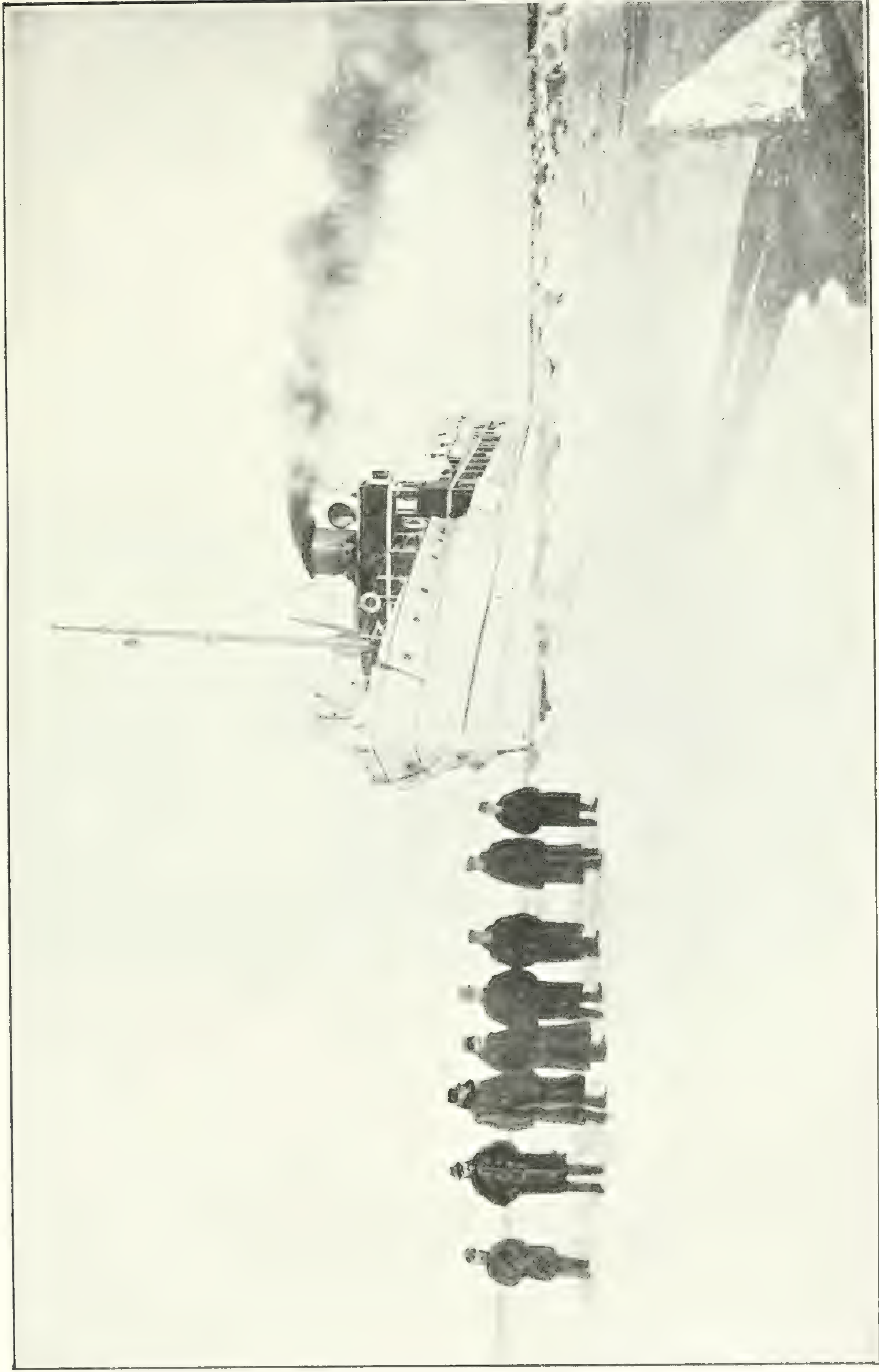
Pigeon Island Lighthouse (incomplete.)



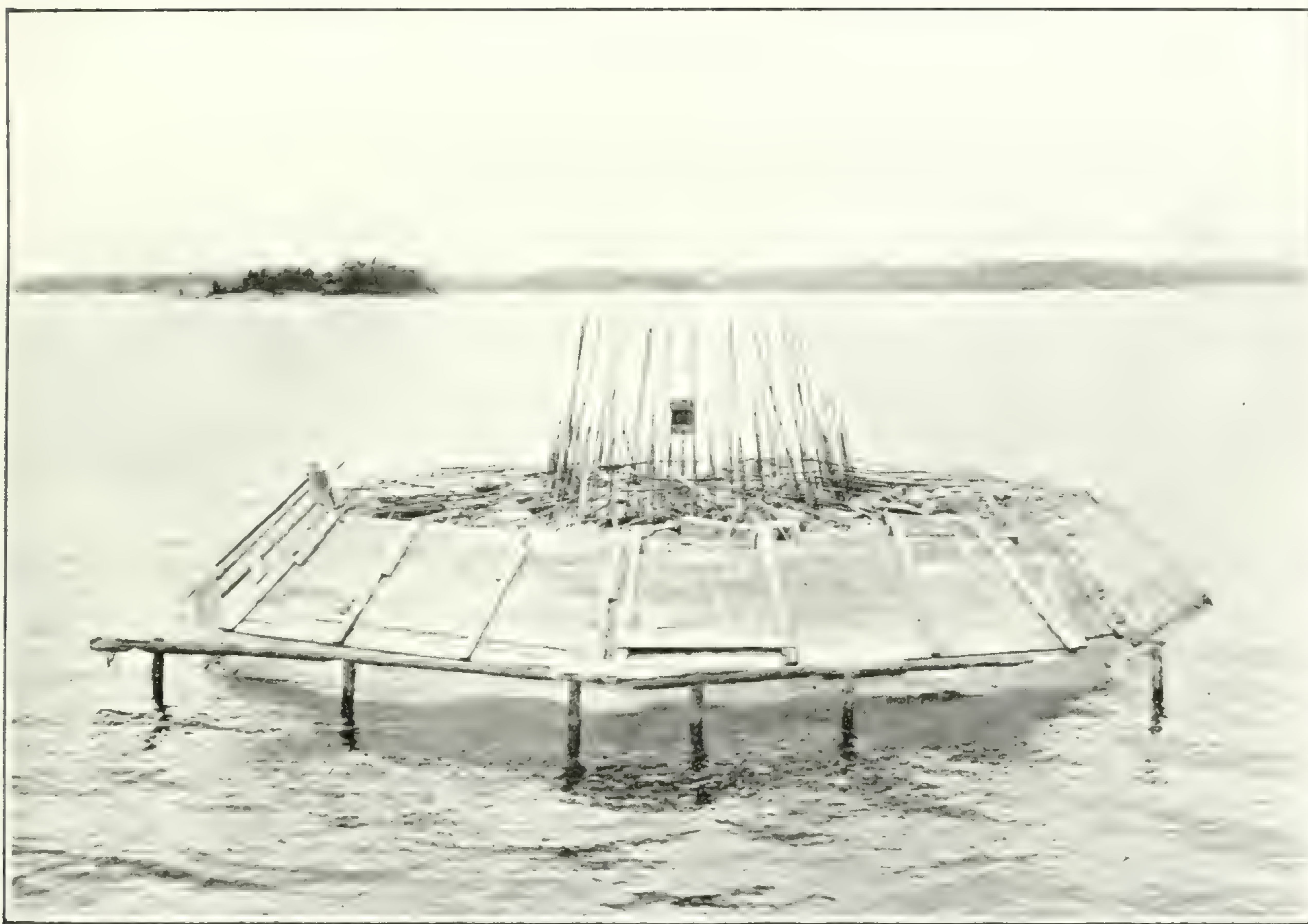
Banfield Creek B.C. Lifeboat House.



Laying Cable from a Tank between Station and Submarine Bell.



C. G. S. "Lady Grey" in the ice opposite Sorel Point, Dec. 1906.



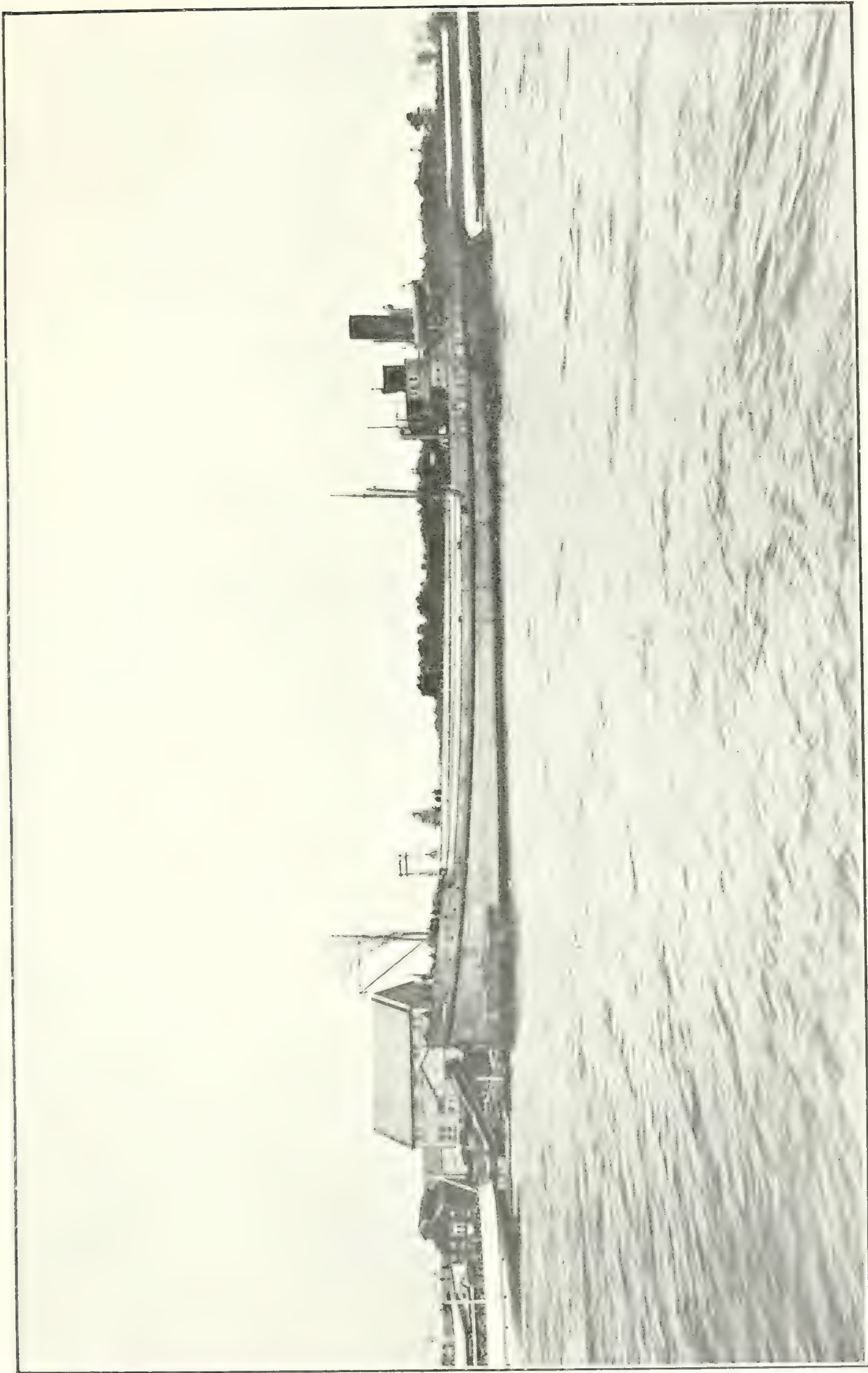
Spruce Shoal Crib near Parry Sound, where First Sunk Aug. 12, 1907.



"Lady Grey" working in Lake St. Peter ice, three to four feet thick.



East Point Light Station, P.E.I.



Dredge "Galveston" (No. 9.)



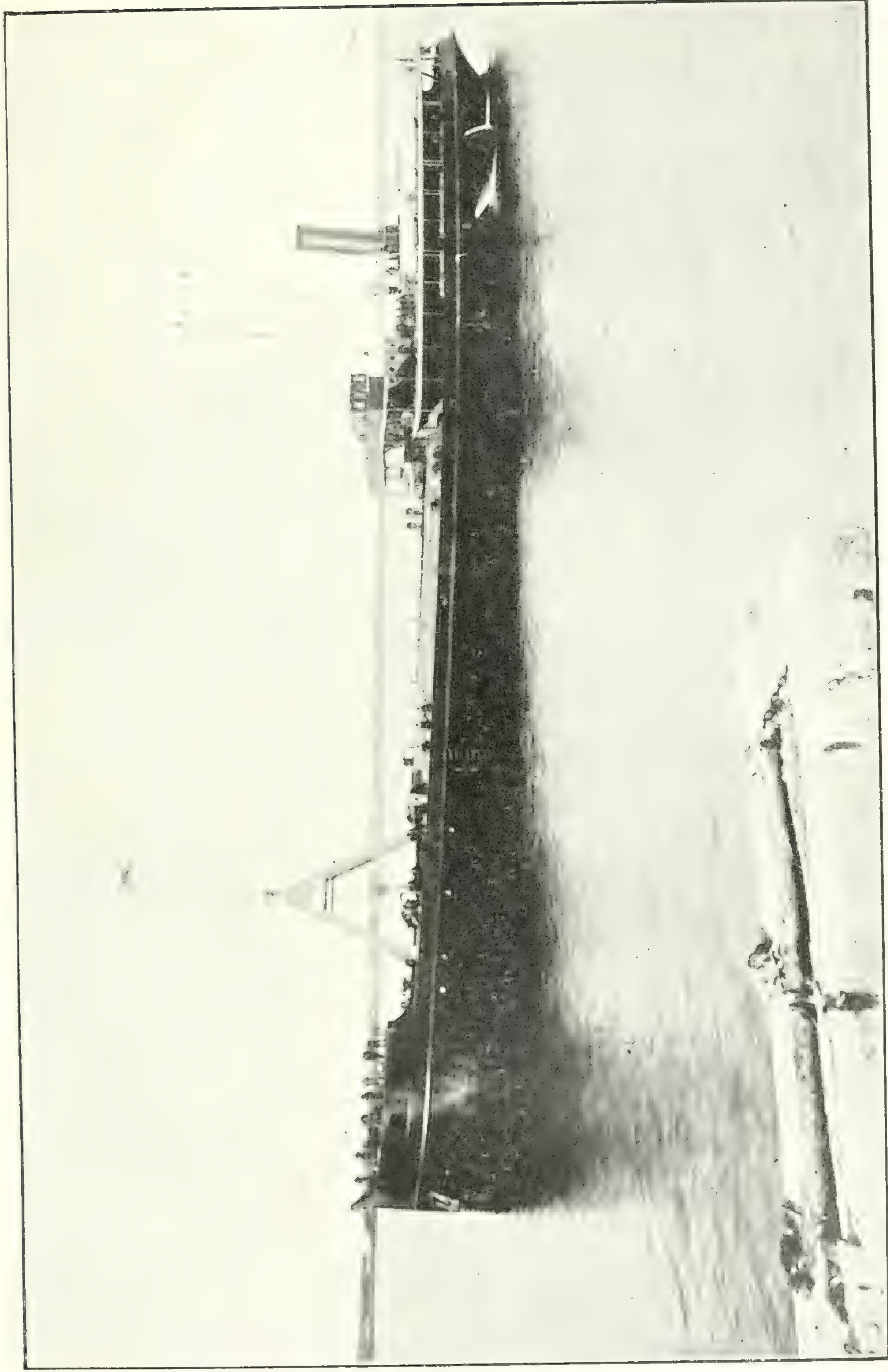
The "Arctic" in Winter Quarters, Albert Harbour, Ponds Inlet, 1906-7.



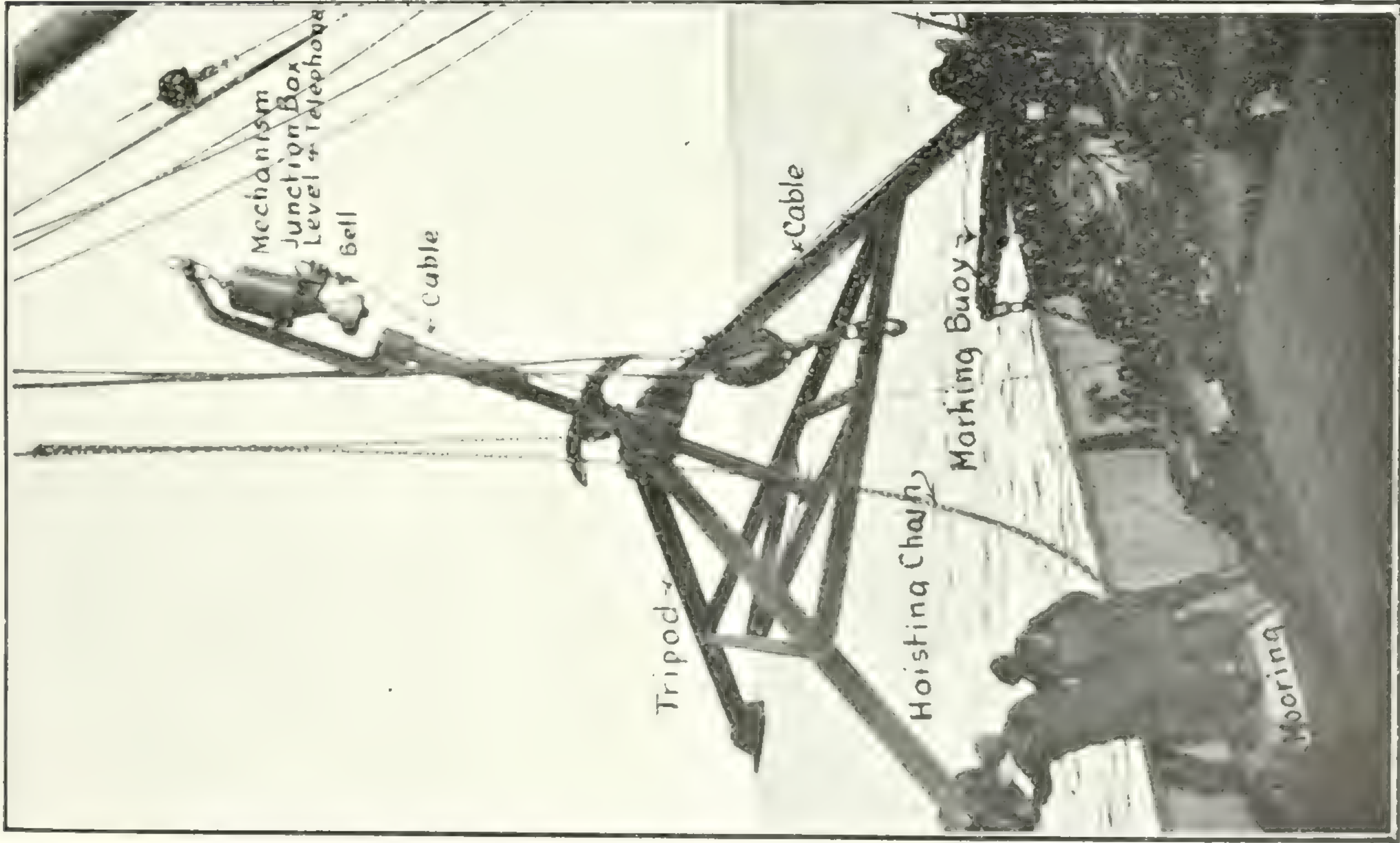
Little Hope Island Station, Showing Concrete Tower.



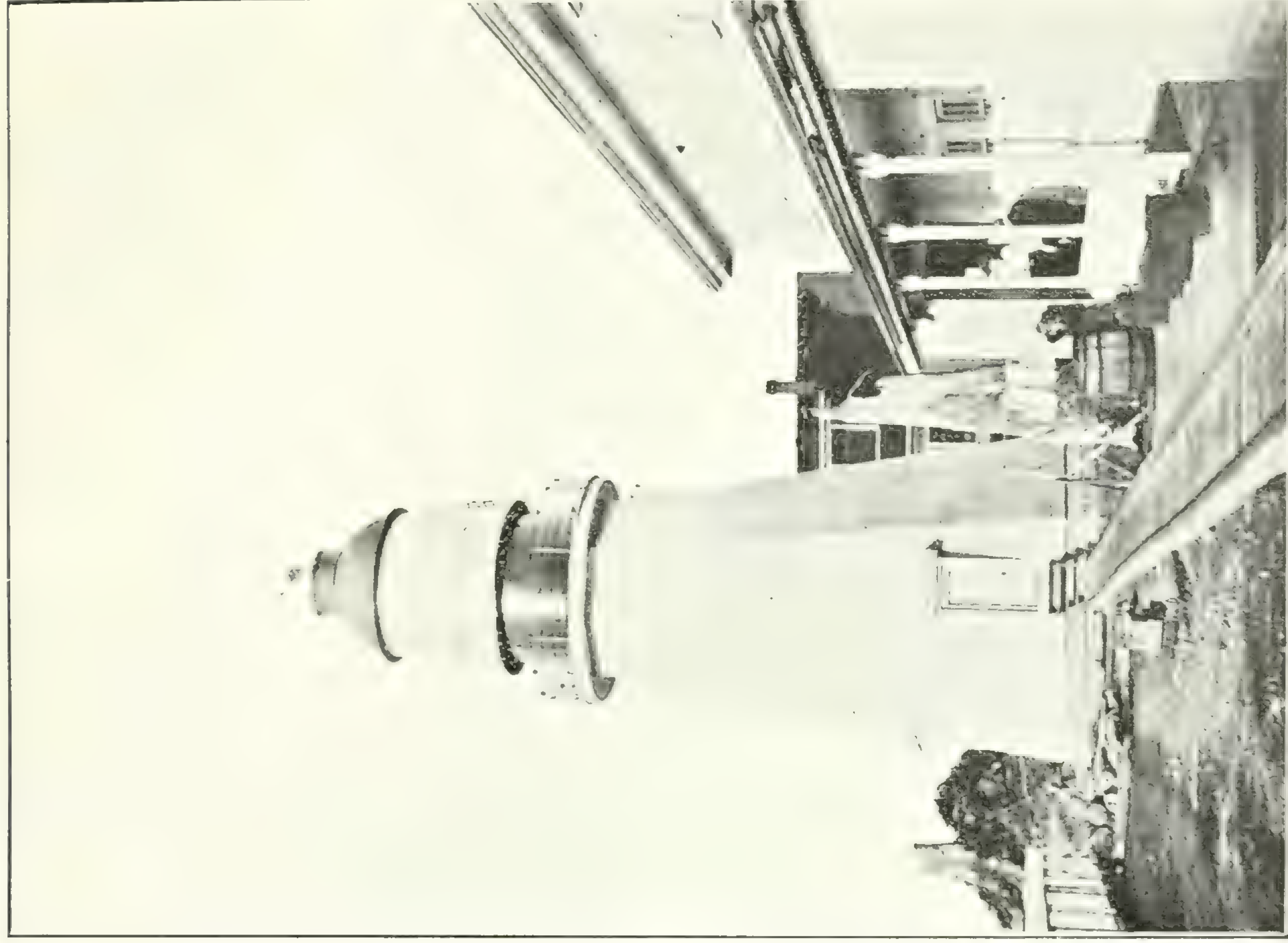
Prince Rupert. B.C., Docks.



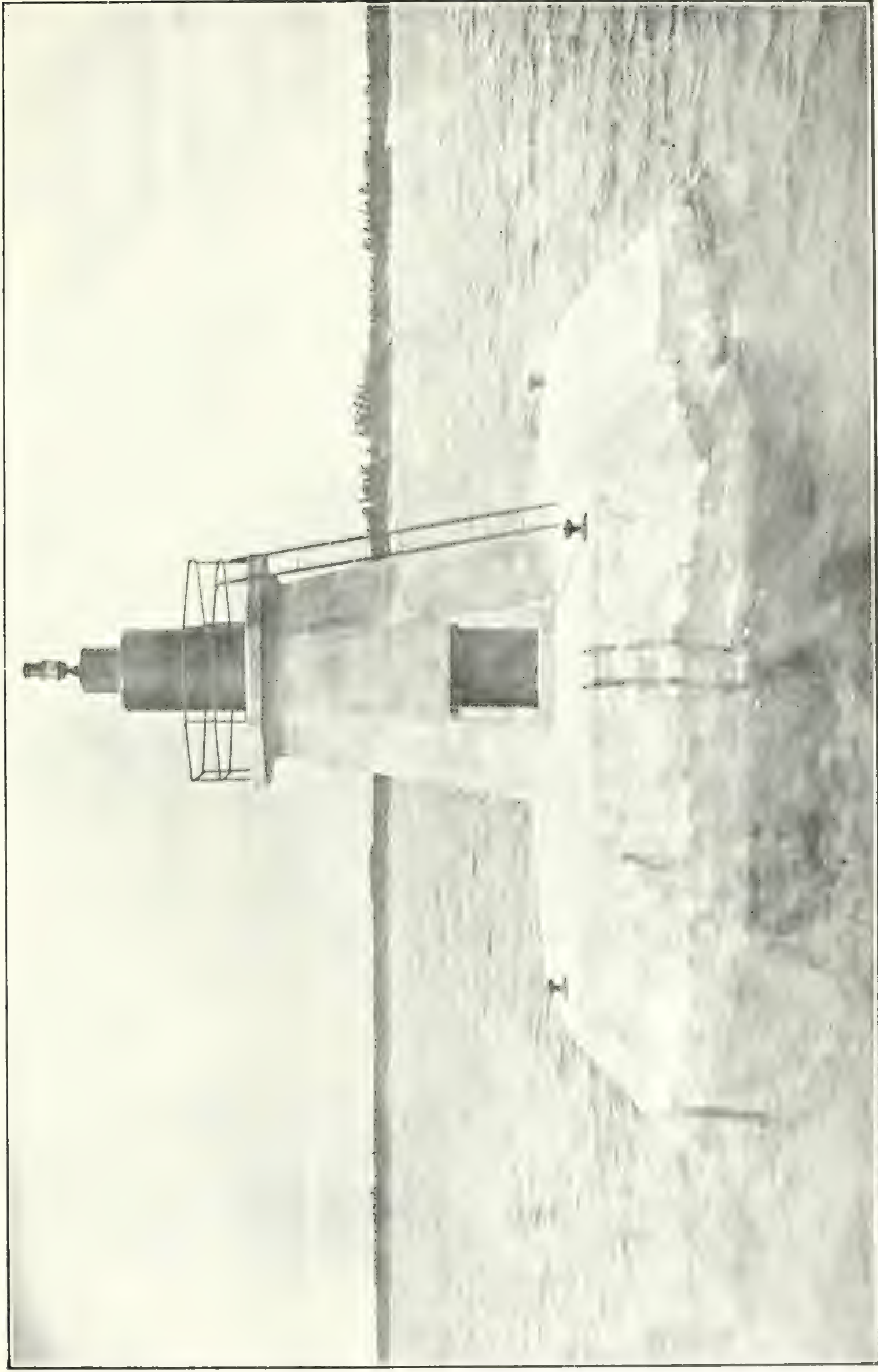
Dredge "Beaujeu" (No. 8) Before Loading.



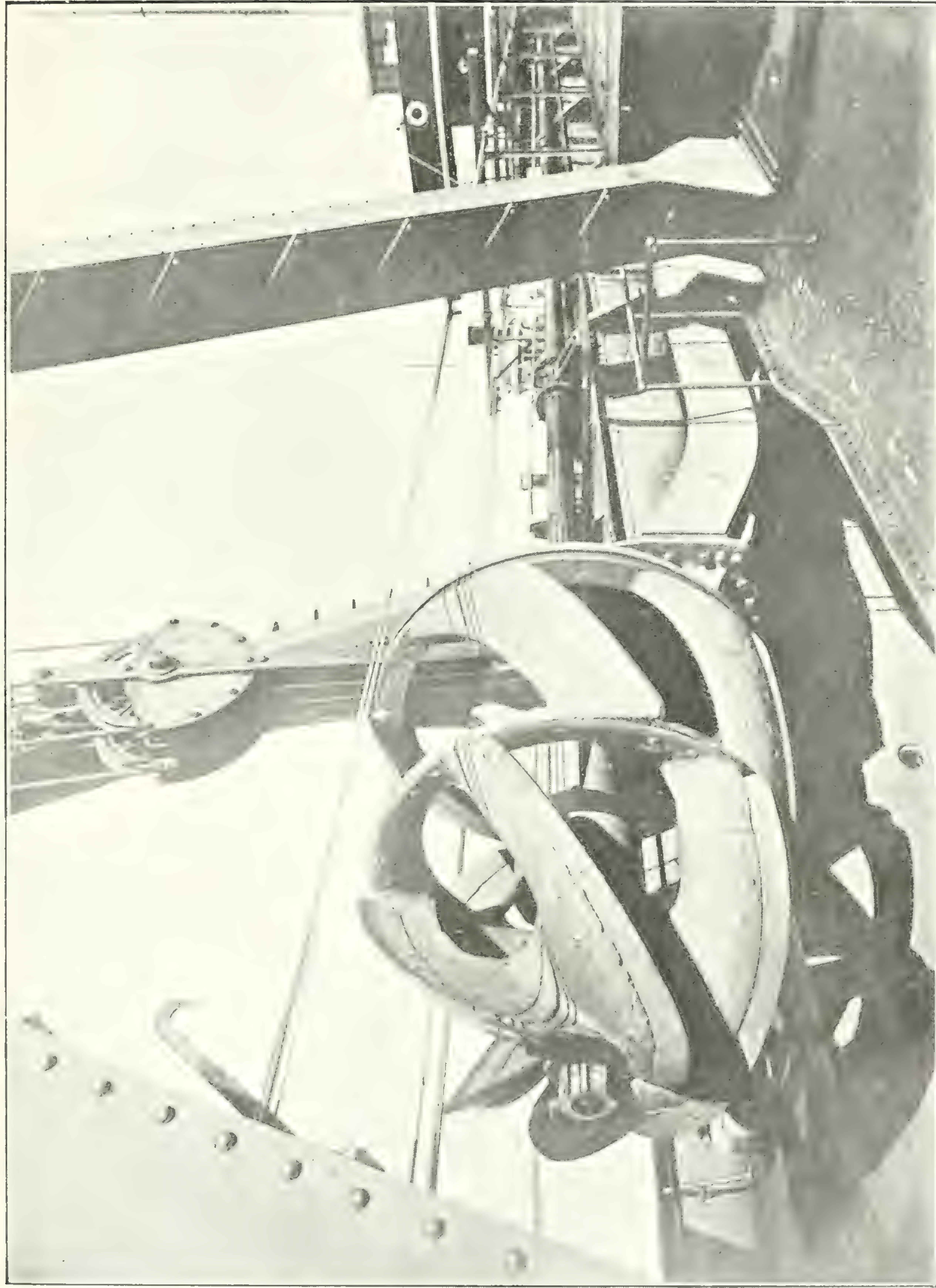
Placing Tripod and Submarine Bell in the Water.



Pachene Lighthouse, B.C.



Spence Shoal, Parry Sound, Gas Beacon, Ont.



Dredge "Beaujeu" (No. 8) Cutter Head.

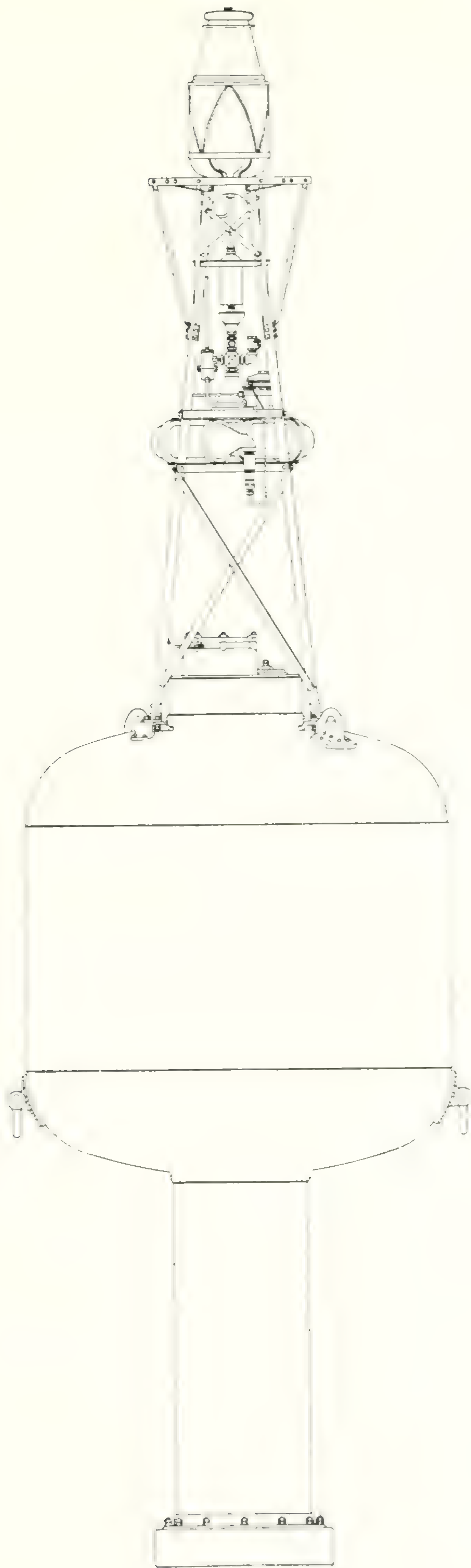


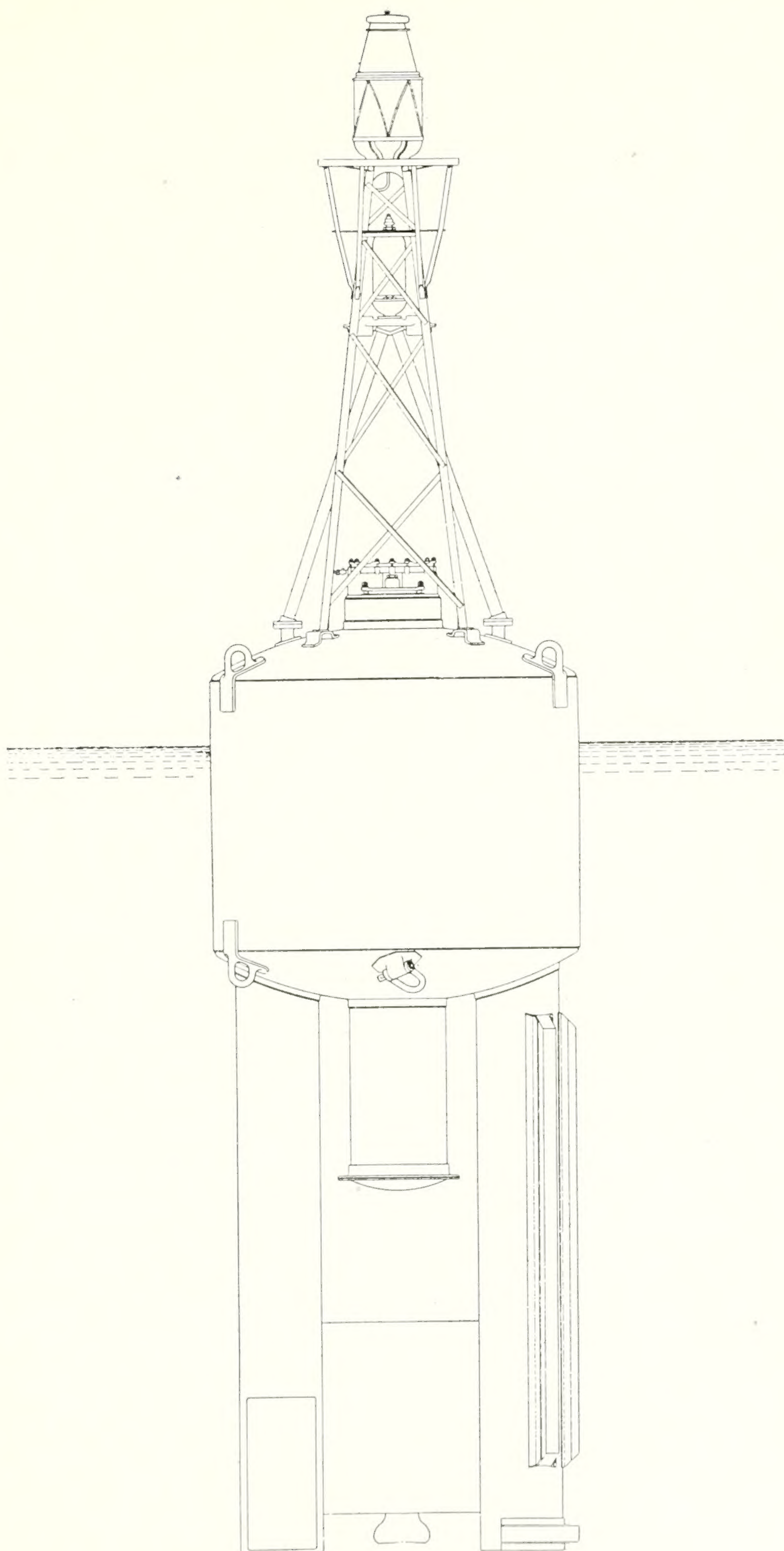
No. 17902.

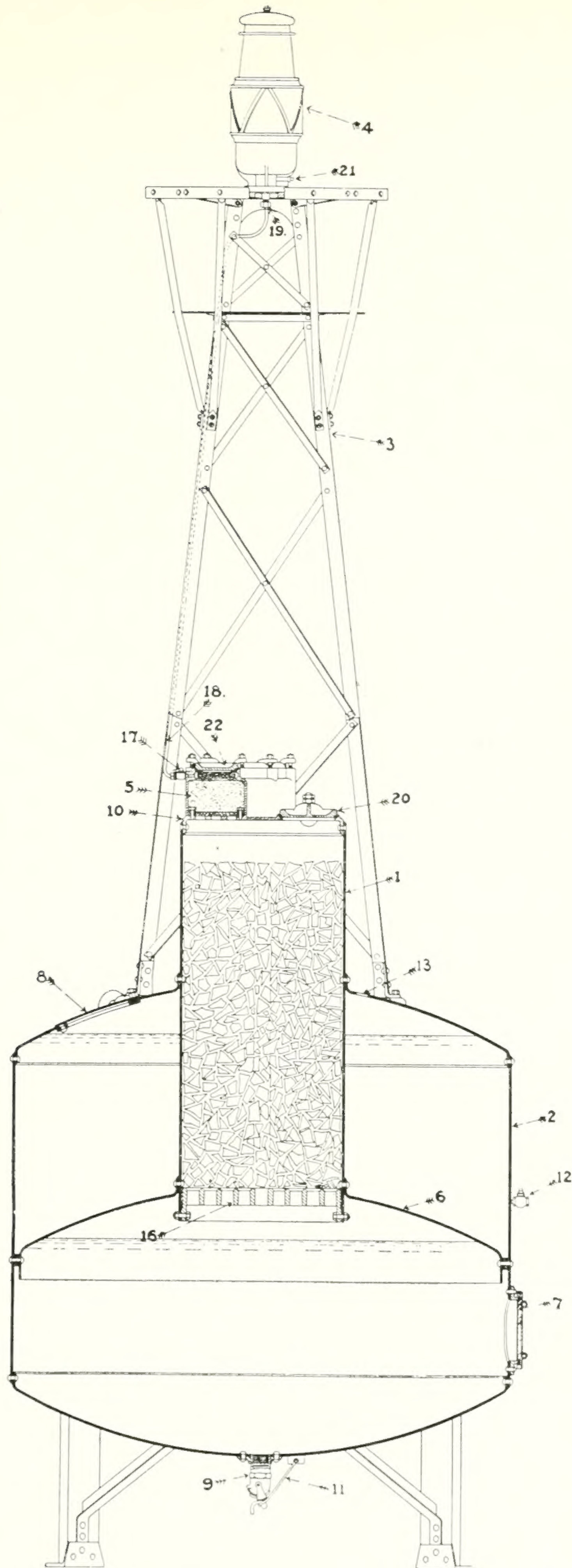
Cape Ray, New Fog Alarm and Marcini Buildings.



Cable Landing Cheburto Head. Cable Connecting Station with Salmagundi Bell.







- | | |
|----------------------|---------------------|
| 1. Gas generator. | 12. Stop collar. |
| 2. Float chamber. | 13. Guard pipe. |
| 3. Lantern support. | 14. Safety cap. |
| 4. Lantern. | 15. Rubber packing. |
| 5. Purifier chamber. | 16. Grate. |
| 6. Counterweight. | 17. Gas valve. |
| 7. Diaphragm. | 18. Gas pipe. |
| 8. Valve. | 19. Coupling. |
| 9. Valve stem. | 20. Carbide door. |
| 10. Generator head. | 21. Vent plug. |
| 11. Operating nut. | 22. Purifier cover. |

